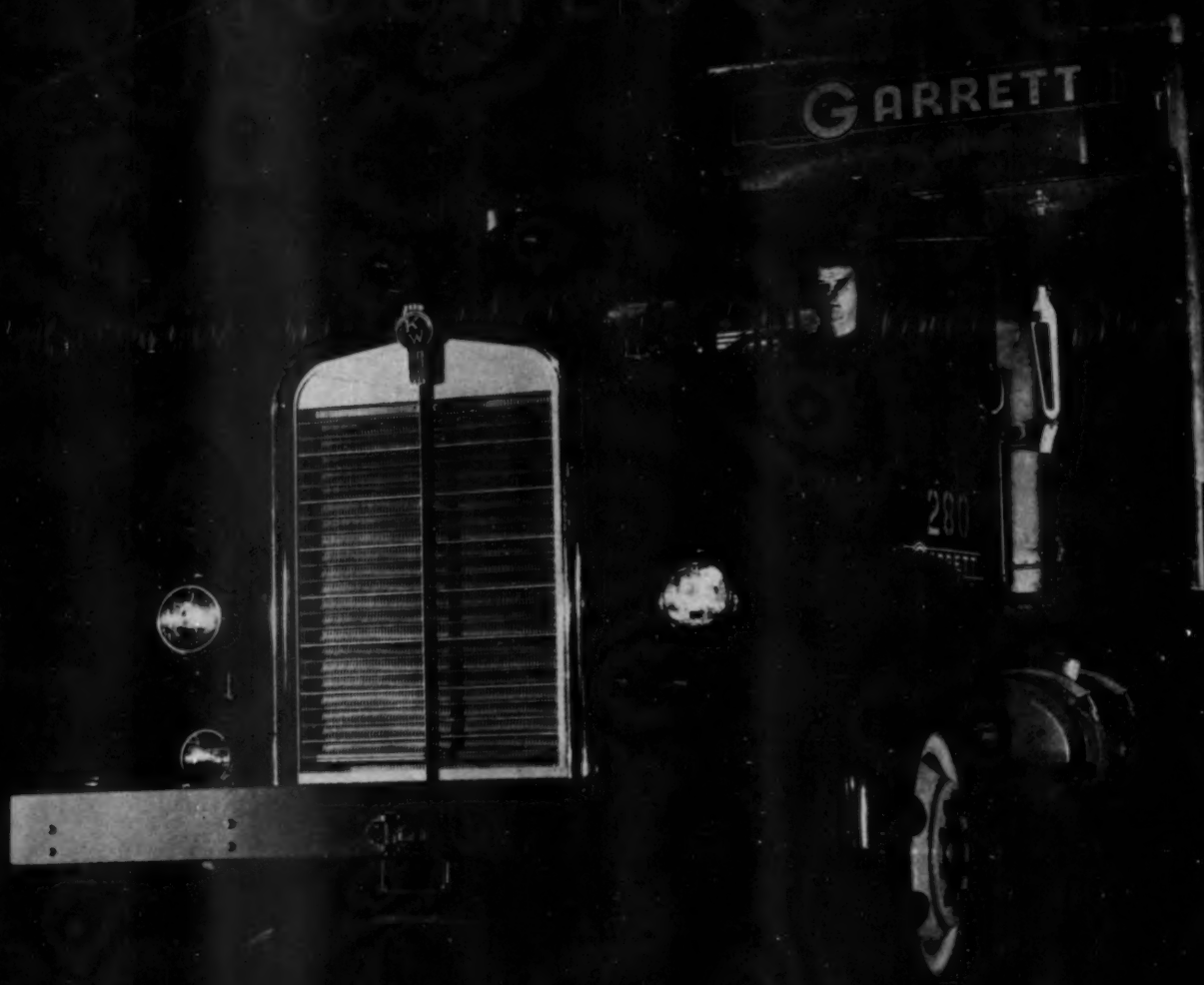
IN INDUSTRY • IN TRANSPORTATION • ON THE SEA • IN THE AIR



FIVE DOLLARS PER YEAR

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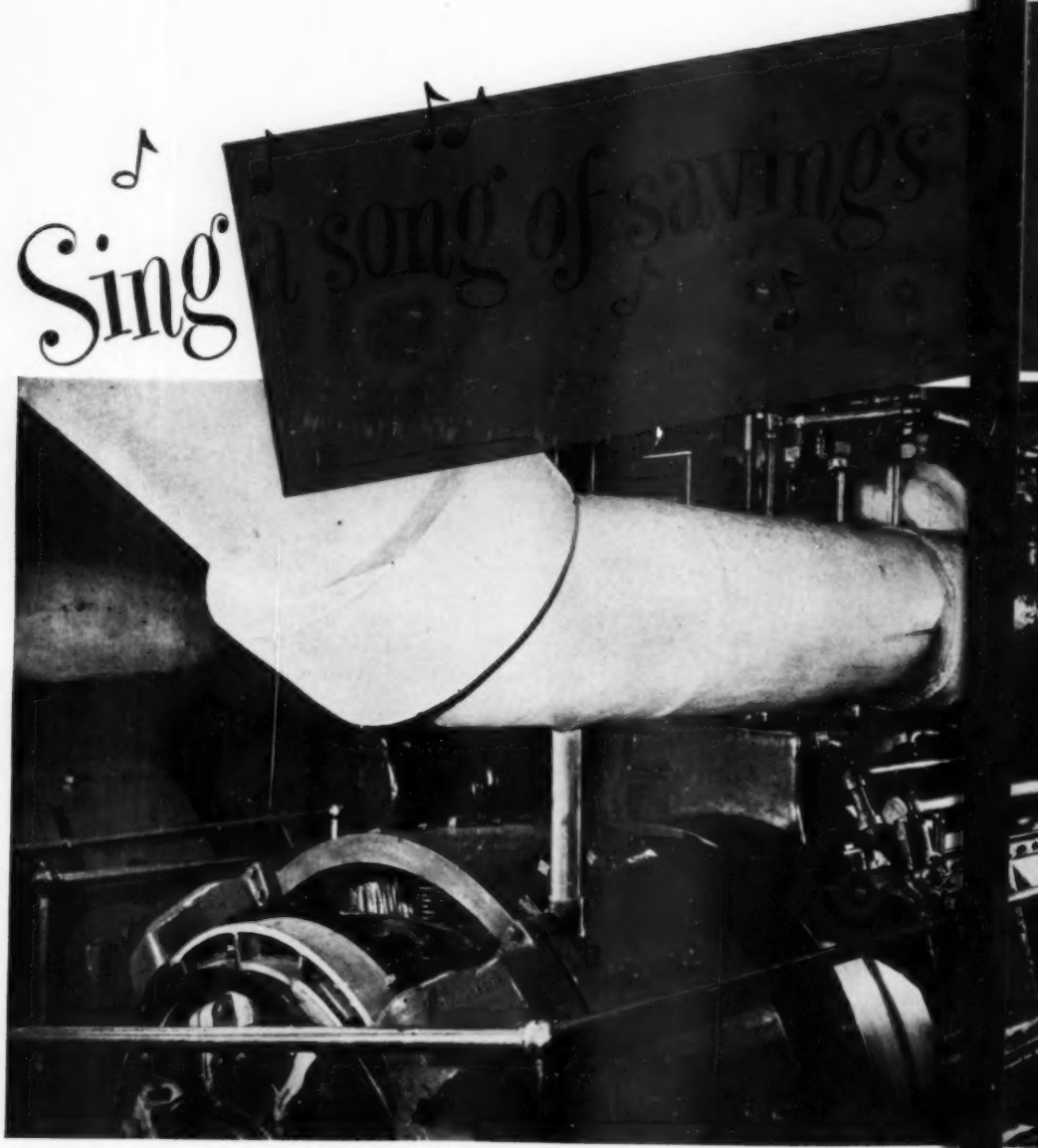
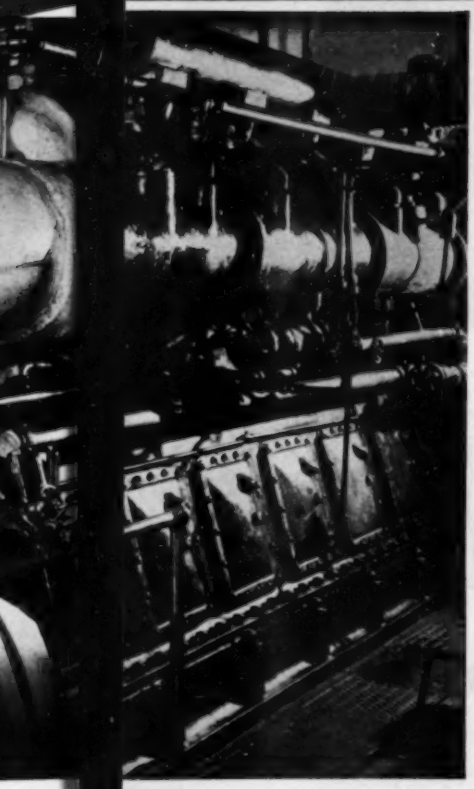


TEXACO

TEXACO

DIESEL PROGRESS for July, 1931, Volume XVII, Number 7. DIESEL PROGRESS is published monthly by Diesel Engines, Inc., 816 North La Cienega Boulevard, Los Angeles 46, California. Rex W. Wadman, President. Subscription rate: $3 per year, single copy 30c. Acceptance under 34.64, P. L. & R., authorized.

Lubricate with TEXACO URSA OILS



Your engines—Diesel, gas or dual-fuel—will really hum when you lubricate with *Texaco Ursa Oils*. And *you'll* sing their praises when you see how these famous oils resist oxidation . . . assure clean engines, free rings, open ports and properly functioning valves . . . real harmony.

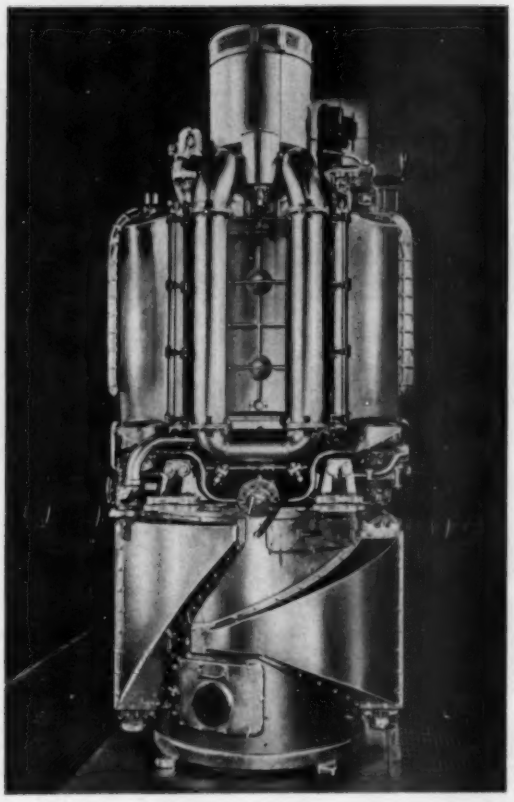
Texaco Ursa Oils thus assure better compression and combustion, smoother operation, minimum wear. Bearings and all moving parts last longer . . . maintenance costs and fuel consumption go down. Change your tune . . . switch to *Texaco Ursa Oils* for stepped-up efficiency and economy.

Texaco Diesel lubricating oils are available in every needed viscosity, and there is a complete line of them approved by leading engine builders. They are No. 1 in popularity from coast to coast! For example —

More stationary Diesel h.p. and more railroad Diesel locomotives in the U.S. are lubricated with Texaco than with any other brand.

Let a Texaco Lubrication Engineer direct you to greater savings throughout your plant. Just call the nearest of the more than 2,000 Texaco Distributing Plants in the 48 States, or write The Texas Company, 135 East 42nd Street, New York 17, N. Y.

URSA OILS FOR ALL DIESEL, GAS AND DUAL-FUEL ENGINES



Newest, lightest, most compact SUBMARINE ENGINE

NOW being installed in the United States Navy's newest attack submarines is a remarkable new radial-type Diesel engine.

Developed for the United States Navy by Cleveland Diesel Engine Division of General Motors, this 16-cylinder, 2-cycle Diesel is the lightest Diesel engine available in this power range. It is so compact that it is only about one third the weight and size of engines previously used for submarine propulsion!

Compact, economical and, above all, dependable, GM Diesel Electric Drive is the power plant that pays its way in all types of marine operations.

ENGINES FROM 150 TO 2000 H.P.

GM DIESEL POWER

Leader in Diesel engineering development for 39 years

Cleveland Diesel Engine Division

CLEVELAND 11, OHIO

GENERAL MOTORS

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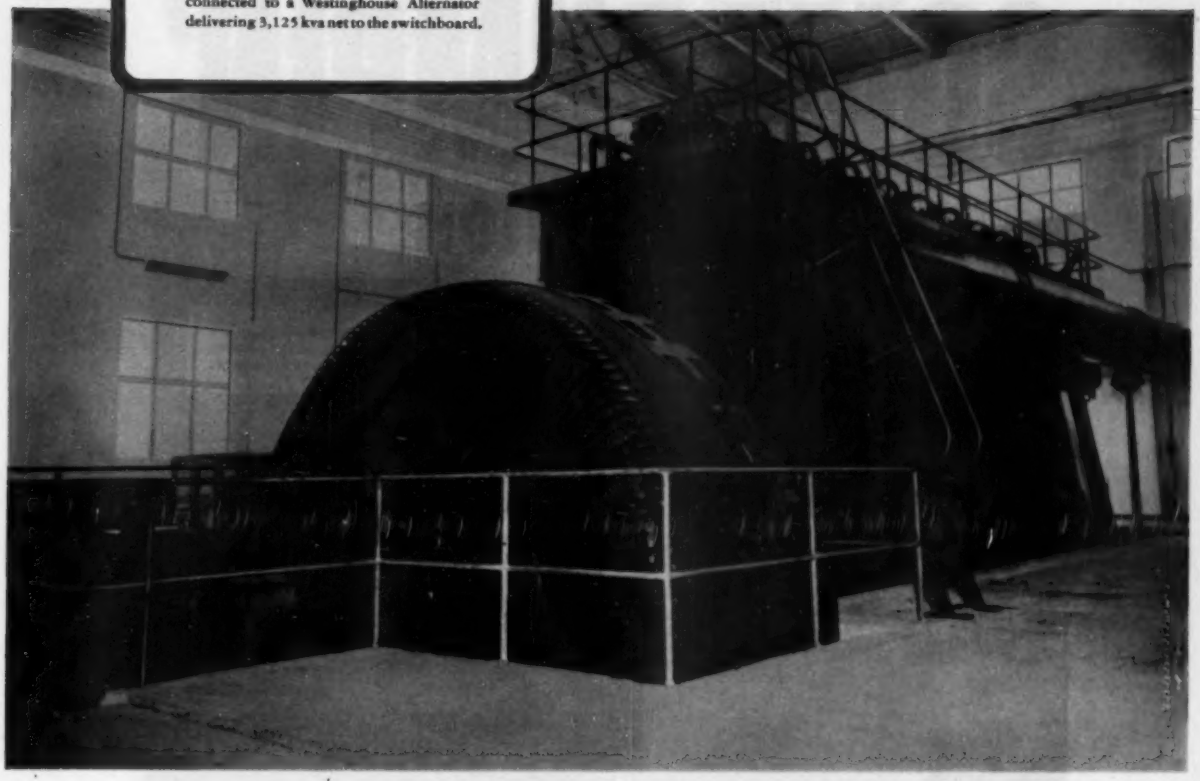
This is the first American-made engine generator unit installed at the power plant of the Bermuda Electric Light Co., Ltd. The Nordberg Diesel Engine is direct-connected to a Westinghouse Alternator delivering 3,125 kva net to the switchboard.



This generator unit turned the tide at Bermuda

Here is the first American generator unit installed at the Bermuda Electric Light Co., Ltd. Prior to 1939, all the generating units were of British make. This unit changed the pattern . . . consisted of a Westinghouse Generator and a Nordberg Diesel Engine. The outstanding performance of this unit was responsible for another similar installation in 1950.

Westinghouse Generators create such acceptance because of their reliability—long life—performance. Once you specify Westinghouse you'll always specify Westinghouse. Take the fabricated steel rotor . . . it has been designed with such a high factor of safety that it is practically unbreakable. The all-steel frame makes possible a stator assembly having maximum strength and the permanent tightness of core that is necessary for a quiet, smooth-running machine. Electrical efficiency is tops, too . . . materials are so proportioned that the maximum efficiency of conversion is obtained from three-quarters to full load.

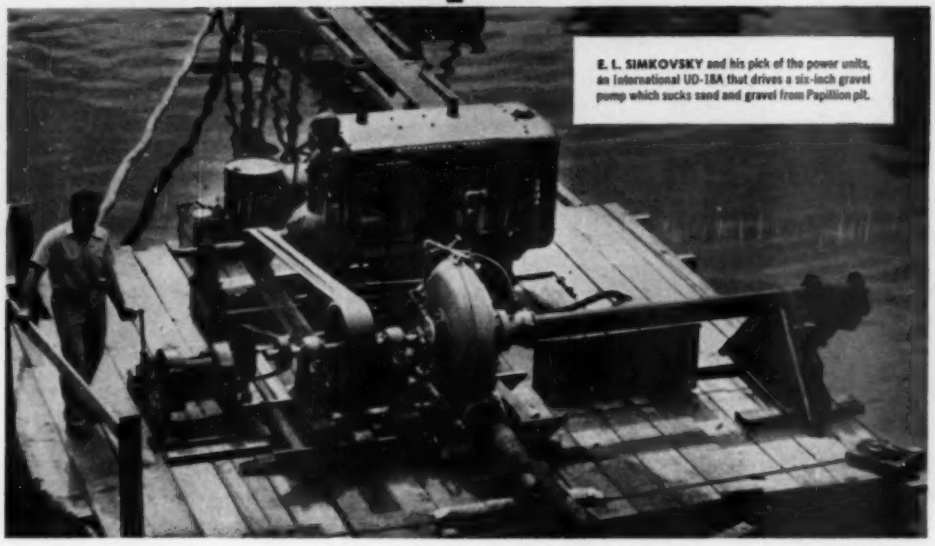
Call your Westinghouse Power Apparatus Specialist for complete consultation on your generator installations. He will work with you on the design, selection and application of the right equipment. Westinghouse Electric Corporation, P. O. Box 868, Pittsburgh 30, Pennsylvania. J-10342

YOU CAN BE SURE . . . IF IT'S

Westinghouse

A-C GENERATORS

SOME PUMPIN'
at Papillion



E. L. SIMKOVSKY and his pick of the power units, an International UD-18A that drives a six-inch gravel pump which sucks sand and gravel from Papillion pit.

New Gravel Pit Owner Finds International UD-18A Backs Up His Judgment in Picking an Engine

"I looked them all over before I bought an engine for my first sand and gravel plant," says E. L. Simkovsky of the Richland Sand & Gravel Company, Papillion, Nebraska.

"I studied power curves and fuel consumption charts. I visited a lot of installations. I wanted the best.

"And I got it—an International UD-18A. The power is even more than I hoped for, and it's very easy to start and economical to run. It has backed up my judgment in every way."

If you're like Mr. Simkovsky—if you want to be shown—get all the facts before you buy. Add them up—then you be the judge. See how International Diesels come out on top by any comparison test.

Need technical information? Your International Industrial Distributor or Power Unit Dealer has the answers. He also has the service facilities, the trained mechanics and the International parts supply. Get acquainted with him!

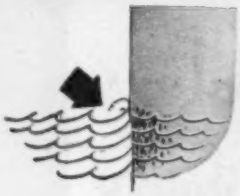
INTERNATIONAL HARVESTER COMPANY, CHICAGO 1, ILL.

POWER THAT PAYS

INTERNATIONAL HARVESTER

INTERNATIONAL

Beat Erosion...



GUN IRON CAST PARTS

The proof of Gun Iron's erosion resistance has come from a wide variety of applications. One typical example is the case of cylinder liners for diesel engines. Chemical impurities in the water used for coolant cavitate ordinary liners to the point where they are useless long before worn out. Gun Iron liners satisfactorily withstand erosion and at the same time give longer wear on the cylinder wall. Users report tremendous savings in maintenance and replacement costs.

If your cast parts are subjected to frictional wear, heat, pressure or erosion, it will pay you to investigate Gun Iron. Our engineers are ready to assist you in determining its value. **HUNT-SPILLER MANUFACTURING CORP., 387 Dorchester Ave., Boston 27, Mass.**

Canadian Representatives: Jos. Robb & Co., Ltd., 4050 Namur St., Montreal 16, P.Q.

HERE IS A PRACTICAL GUIDE for the user of iron and steel castings . . . 24 pages of technical data on many types of metals and alloys. Write for your free copy.

One Control..... One Responsibility

THE final result of this youngster's activity is entirely dependent upon his ability. That's the way we here at Erie Forge approach your problem—we take over completely—One Control—One Responsibility. Every step — from raw material to finished crank is accomplished here. Design, metallurgical control, casting, heat treating, forging and machining are under the constant watchful supervision of fine craftsmen with many years of experience. Consult with us on your next requirements for crankshafts, connecting rods or allied items.

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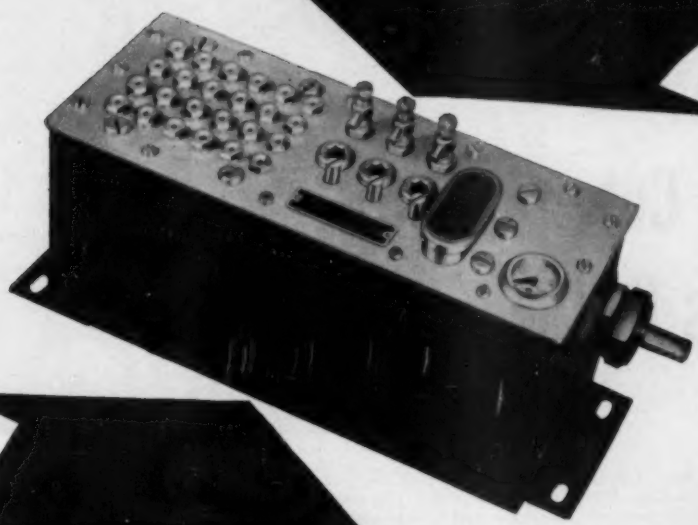
MADISON-KIPP

Fresh Oil LUBRICATORS



THE MOST DEPENDABLE OILING SYSTEM EVER DEVELOPED!

MEASURED FEED DROP BY DROP FED UNDER PRESSURE!

MACHINE performance is in direct relation to the quality of the oiling system! And that's why builders of America's finest machine tools, work engines and compressors specify Madison-Kipp "Fresh Oil" Lubricators as original standard equipment . . . because they provide the most dependable oiling system ever developed . . . measured feed, drop by drop, fed under pressure. There are six models to meet almost every application requirement. Illustrated is the Model FD. Please address all inquiries to the home office in Madison, Wisconsin

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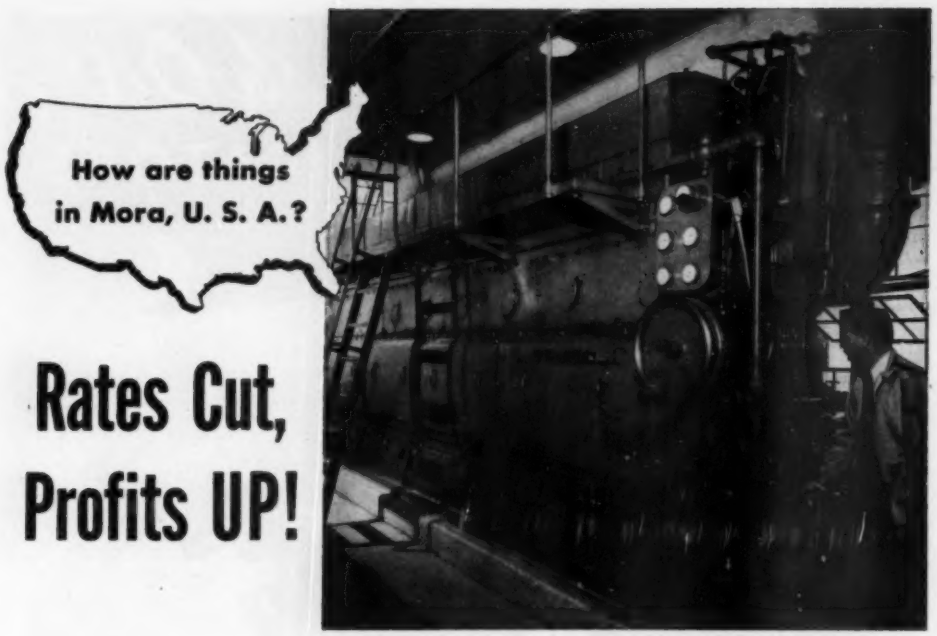
- *Skilled in* DIE CASTING *Mechanics*
- *Experienced in* LUBRICATION *Engineering*
- *Originators of Really High Speed* AIR TOOLS



Rates Cut, Profits UP!

Things are as good in Mora, Minnesota as the song says they are in Glocca Mora.

Worthington Diesel engines operated by the municipal power plant in this progressive community have helped produce the lowest electric rate of any full Diesel municipal power plant in the state.

A Worthington 4-cycle supercharged engine, operating at low load factor of 42.6%, produced in 1950 5% more power per gallon of fuel than a 2-cycle engine operating at 59.4% load factor. Following the installation of the Worthington engine, rates were cut in 1949, yet net profits, in 1950, were greater than ever.

Worthington four-cycle supercharged engine is particularly well suited to the needs of a growing community like Mora —whose peak kw load has increased an average of 11% a year in recent years. Even when over-powered, a plant can operate at very low fuel cost and have the added engine capacity when needed without additional investment.

When you buy a Worthington 4-cycle supercharged engine, you benefit, too, from the *longest experience* of any manufacturer with this type of engine. For any engine application, call on Worthington—an engine for any fuel: oil (crude or regular), gas or "dual fuel". Worthington's complete line of engines assures you of the most economical operation no matter what fuel you use.

If gas or any combination of gas and oil offer fuel economies, consider Worthington gas or dual fuel engines. Only Worthington offers such exclusives as dual plunger pumps, gas micro-metering valves for each cylinder and thermal air controls —all built to give optimum performance for the fuel used.

For further details of the dependable, economical Diesel performance that proves *there's more worth in Worthington*, contact Worthington Pump and Machinery Corporation, Engine Division, Buffalo, New York.

WORTHINGTON

E.1.10

ECONOMICAL CONTINUOUS POWER
Diesel Engines, 150 to 2640 hp
Gas Engines, 190 to 2880 hp
Dual Fuel Engines, 345 to 2640 hp

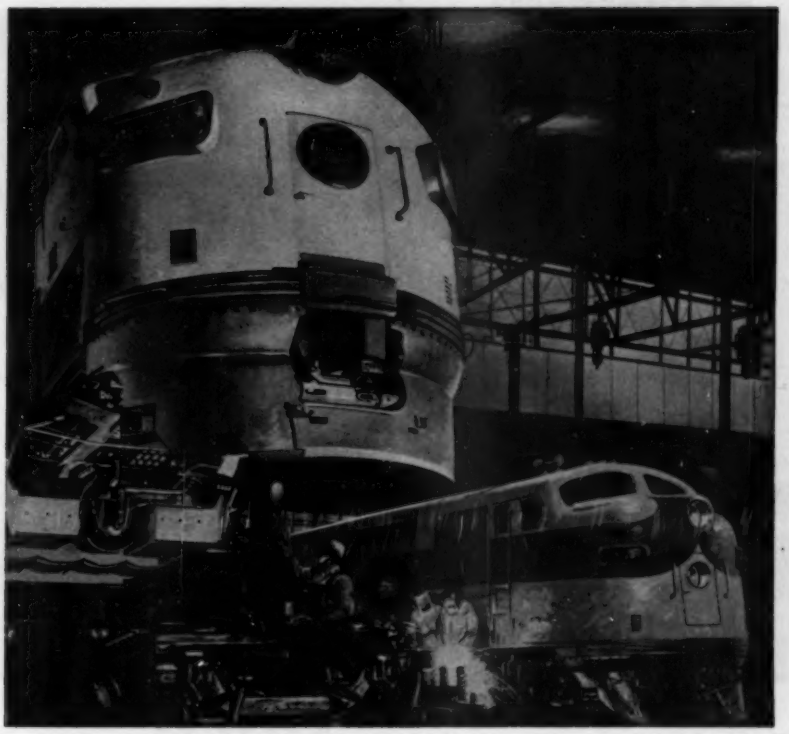
WORTHINGTON-BUILT AUXILIARIES

Balanced Angle Compressors

Oil Transfer Pumps

Cooling Water Circulating Pumps

Evaporative, Type Engine Water Coolers



ARSENAL of HORSEPOWER!

To meet America's growing transportation needs —especially in the hour of national emergency —Electro-Motive Division shops are now building General Motors Diesel locomotives as rapidly as facilities and supplies permit. Their combined output is the largest production of new railroad horsepower in the world today, and a major contribution to our nation's strength, for many reasons.

Today General Motors Diesels are the work horses of the railroads. They are hauling 33% of the total freight ton-miles and 40% of the total passenger car-miles reported by all roads, *yet they number only 15 per cent of America's locomotive fleet!* And with General Motors Diesel power, trains maintain faster schedules, speeding up the re-use of cars.

It is power that can be depended upon when the chips are down. In 16 years' service on the rails no General Motors Diesel has ever worn out—thanks to Electro-Motive's unique parts and component rebuilding service. Parts depots and factory branches located at central points give railroads quick service in keeping their General Motors Diesels "on the line."

Because General Motors locomotives do more work they pay for themselves faster and contribute savings for the purchase of other new equipment needed by the railroads for better service. That is why the demand for these modern Diesels is so urgent today—for long experience proves that better trains follow General Motors locomotives.

GM LOCOMOTIVES

ELECTRO-MOTIVE DIVISION

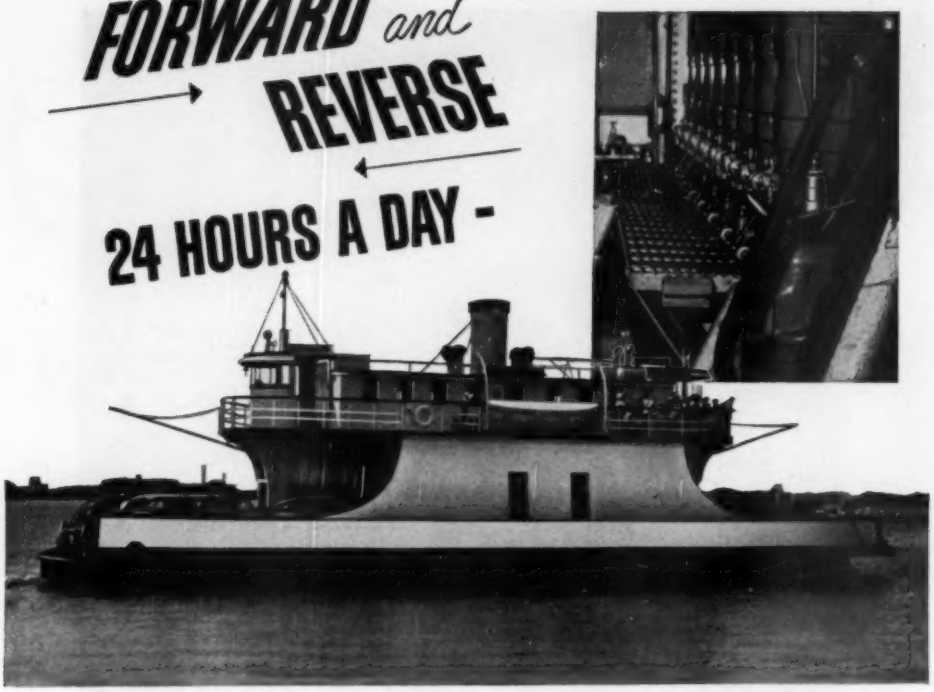
GENERAL MOTORS • LA GRANGE, ILLINOIS

Home of the Diesel Locomotive

In Canada: GENERAL MOTORS DIESEL, LTD.; LONDON, ONT.

FORWARD and REVERSE

24 HOURS A DAY -



Down in Galveston, Texas, there is a real proving ground for diesel stamina and dependability. Here the ferry boat "Galveston", during the busy summer season, plies across the mouth of Galveston Bay on a round the clock schedule. This busy "double ender" ferry never even turns around in its 24-hour schedule—making the trip one way in forward and returning in reverse.

The dependable power that is so vital a requirement for this rigorous schedule is provided by an Enterprise Diesel equipped with Bendix Fuel Injection Equipment. Just another demonstration that where dependability is a prime requisite Bendix Fuel Injection equipment is the logical choice.

—WITH

BENDIX

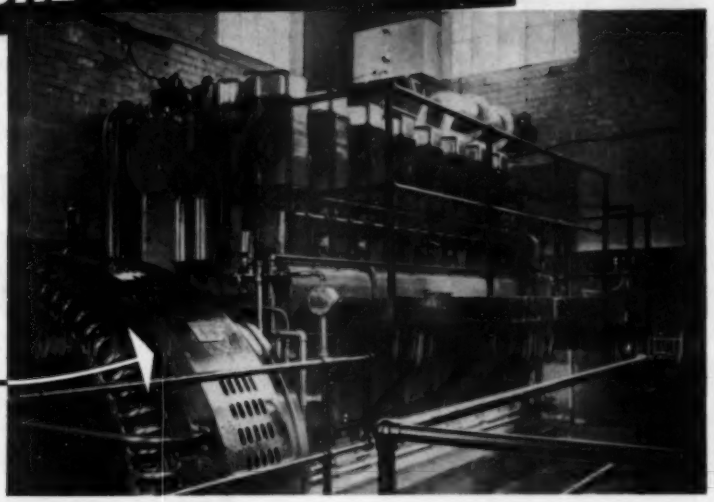
FUEL INJECTION EQUIPMENT

SCINTILLA MAGNETO DIVISION of
SIDNEY, NEW YORK

Export Sales: Bendix International Division, 72 Fifth Ave., New York 11, N.Y.
Western Market Office: 582 Market Street, San Francisco 4, Calif.

Bendix
AVIATION CORPORATION

This 925 H.P. ENTERPRISE DUAL-FUEL ENGINE



WILL SAVE $6,100 A YEAR AT SANGER, TEXAS

Since the City of Sanger recently installed its fourth diesel—a 925 hp Enterprise Turbocharged Dual-Fuel Engine—operational cost studies have revealed some remarkable economy figures. *Based on current operations, fuel and lube oil costs alone will amount to $6100 less per year for the Enterprise unit than for the other three diesels combined—for the same amount of energy generated!*

Economies such as this are being enjoyed by communities wherever Enterprise Turbocharged Dual-Fuel Engines are in service. These versatile units embody all the long-proved features of Enterprise straight diesel operation, plus the economies available through low-cost gas operation. Simplified controls provide for instant mixture adjustment or changeover from one fuel to the other *under load*, with no possibility of dangerous overloads.

Expertly engineered throughout, Enterprise Dual-Fuel Engines offer the ultimate in flexibility, economy and dependability for all heavy duty continuous and intermittent power applications. Write today for Dual-Fuel Bulletin No. DF-200.

Enterprise STATIONARY Diesels

The Choice of Power Experts

ENTERPRISE ENGINE & MACHINERY CO.
A Subsidiary of General Metals Corporation
18th & Florida Streets, San Francisco 10, California
Offices in Principal Cities

STANDARD ENGINEER'S REPORT

DATA

LUBRICANT RPM Delo Oils

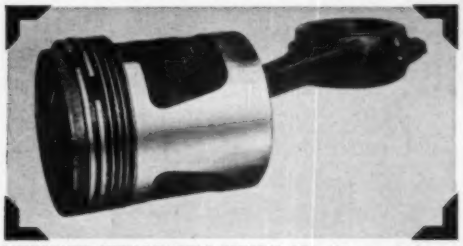
UNIT 1½ ton truck – 6 cyl. Ford-Model F5 engine

CONDITIONS Low engine temperatures – City deliveries

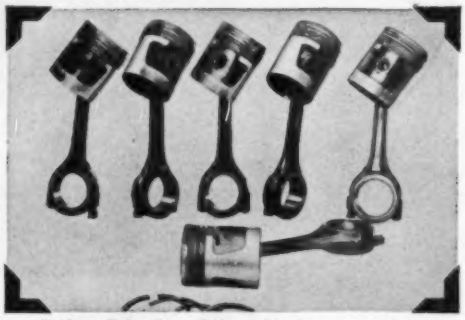
PERIOD 2 years

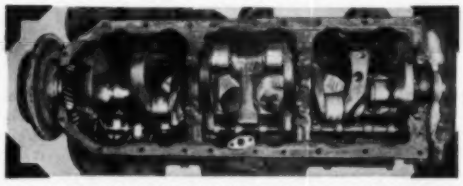
FIRM Pacific Cheese Division of Borden, San Francisco, Cal.

Only 0.004 inch wear in 68,740 miles stop-and-go driving!



LUBRICATED WITH RPM DELO SPECIAL OIL, these pistons from an engine overhauled for the first time after two years and nearly 70,000 miles of tough delivery-service operation, had no broken or stuck rings. Grooves were clean and all oil-return holes open. All bearings, including mains, were in good condition. Reboring of the cylinders was not necessary because none of the six cylinders was out of round and taper ran only 0.004 to 0.0045 inch.





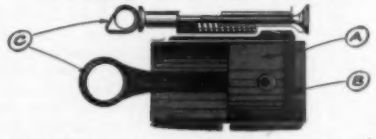
THE ENGINE WAS EXCEPTIONALLY CLEAN as this picture indicates. Cylinder walls were free of lacquer and there were no deposits in valve chambers. Only a thin carbon film was in the bottom of the pan. Valves, pistons, bearings, all parts except rings, were put back in service.

REMARKS: This engine was used in Sacramento under widely varying temperatures. Its stop and go operation seldom allowed engine temperatures to reach normal. There is an RPM DELO Lubricating Oil to meet every heavy-duty engine operating condition.

FREE BOOKLET on the RPM DELO Oils gives you complete information. Write or ask for it today.

RPM DELO LUBRICATING OILS

How RPM DELO Oils meet tough operating conditions



A. Contain special additives that provide metal-adhesion qualities...keep oil on parts whether they are hot or cold, running or idle.

B. Antioxidant resists deterioration of oil and formation of lacquer...prevents ring-sticking. Detergent keeps parts clean, helps prevent scuffing.

C. Special compounds stop corrosion of any bearing metal, and oil foaming in both wet and dry sump engines.

FOR MORE INFORMATION about this or other petroleum products of any kind, or the name of your nearest distributor handling them, write or call any of the companies listed below.

TRADEMARK "RPM DELO" REG. U.S. PAT. OFF.

STANDARD OIL COMPANY OF CALIFORNIA
225 Bush Street • San Francisco 20, California

THE CALIFORNIA COMPANY
P. O. Box 780 • Denver 1, Colorado

STANDARD OIL COMPANY OF TEXAS
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MACK DIESEL TRUCKS

Get Things Done!

Extra effort—that's the order of the day as American industry swings into high gear to meet the growing demands of the nation's expanding defense program.

Nowhere is this more important than in vital truck transportation, the mobile production line that keeps raw materials flowing to plants and factories... speeds the products of America's farms and industries to consumers and the armed forces.

Here's work that's cut out for Mack diesel trucks... jobs where Mack diesels show at their best in rock-bottom operating economy... giving twofold advantages in more miles per gallon at less cost per gallon.

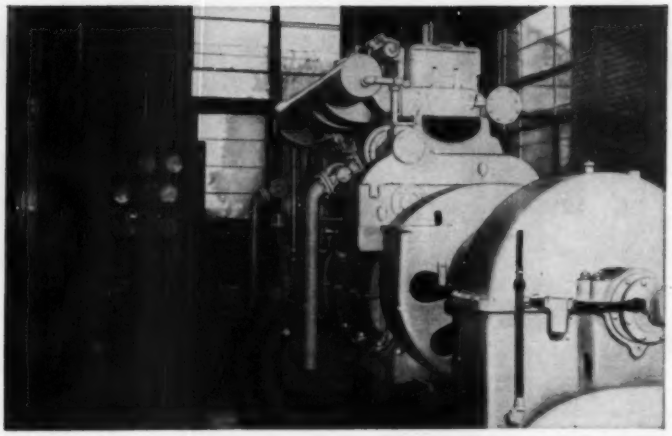
To their demonstrated economy Mack diesel-powered trucks add the further benefits of long-lasting Mack reliability and peak performance for the years to come. Your nearest Mack branch or distributor will show you how Mack diesels can *get things done* on your particular job... more dependably and at lower cost. You'll find it's a story well worth hearing.

Mack TRUCKS

...outlast them all

Mack Trucks, Empire State Bldg., New York 1, New York. Factories at Allentown, Pa.; Plainfield, N. J.; Long Island City, N. Y. Factory branches and distributors in all principal cities for service and parts. In Canada: Mack Trucks of Canada, Ltd.

Mack Model LJT, diesel-powered tractor serving Frozen Food Express of Dallas, Texas.



21,716 hours without forced shutdown

...and still going strong

that's the record of this Alco Diesel Engine at Barnett Station of Shell Products Pipe Line

Listen to Mr. C. C. Curvey, chief operator at Barnett, Ill., speaking:

"The unit operates 24 hours a day and is never shut down except for the annual routine inspection and overhaul. . . . Not only have we boosted capacity of this line 15%, but operating and maintenance costs have been much reduced."

The Barnett station is equipped with a single Alco diesel—replacing a total of 3 old-type engines. This rugged Alco diesel provides power for pumping 1,050,000 barrels a month through the 8-inch pipe line. It's a 6-cylinder, 4-cycle engine with 12½ inch bore and 13 inch stroke, rated at 810 hp and 650 rpm.

Such power and performance can be yours, too, if you install Alco Diesel Engines to meet your pipe line pumping requirements. Your nearest Alco engineer will be glad to help. Call him today at sales offices in New York, Beaumont, Chicago, Cleveland, Houston, Kansas City, San Francisco, Schenectady, St. Louis.

SPEED Vs. WEAR

Remember, since piston speed and journal travel per minute are both almost the same in medium speed and slow speed engines, wear is equivalent as well. Not only do you get unequalled dependability with Alco Diesels—you get long wear and low maintenance costs, no matter how difficult the service conditions.

ALCO DIESELS

THE MARK OF MODERN ENGINEERING

AMERICAN LOCOMOTIVE COMPANY

CLEAN AIR HELPS PAY for 400-Acre PARK

AAF Filters Contribute to High Profit Operation of Kansas Power Plant

The municipal power plant of Garnett, Kan., serves a community of only 2500 people, yet it netted a profit of $141,962.00 from 1945 through 1949. A portion of these earnings were used to develop a 400-acre park complete with swimming pool, golf course, football field and stadium.

The secret of this success story—low maintenance costs in which filtered air played an important role. Three of the four diesel engines are equipped with AAF Type "OC-H" washable, unit-type filters—the fourth and newest engine with a duplex Cycoil Oil Bath Air Cleaner. The oldest engine dating back to 1925 was only recently rebuilt and is now operating 2000 hours yearly. Another engine installed in 1930 has run more than 70,000 hours and still retains its original pistons and cylinder liners.

Here's convincing proof that clean air can pay a handsome profit—of AAF filters' ability to deliver continuous high-efficiency cleaning service. There's an AAF filter of a type and capacity designed to convert your dust into dollars. Write today for complete product literature.

AAF

American Air Filter

COMPANY, INC.

408 Central Avenue, Louisville 8, Kentucky • Darling Bros., Ltd., Montreal, P. Q.

. . . WE HAVE STANDARDIZED ON GM DIESEL ENGINES FROM STEWART & STEVENSON"

Report Loyd Richardson and R. C. Thwing

The decision by Mr. Richardson and Mr. Thwing to standardize on GM Diesel Engines is based on years of experience in general marine contracting work . . . plus the fact that GM Diesel Engines are compact, easy to maintain, and "outperform any other engine in their horsepower range."

The LWR 16 . . . newest boat in the Richardson fleet . . . is a sister ship to the Kabibonoka, one of the first tugs on the Texas Gulf Coast to be powered by a GM Marine Diesel Engine. Other GM powered Richardson tugs are the Jimmie, Loyd W, Dredge, LWR 13, LWR 14, LWR 16 and the Capt. Ira.

Designed by Mr. Richardson and built by Burton Shipbuilding in Port Arthur, the LWR 16 is built to stand the test of heavy duty Gulf Coast towing. Its GM Model 6-110 engine develops 250 maximum horsepower. In operation, the LWR 16 is just as dependable as the GM engine that powers it, and the Stewart & Stevenson service organization that stands behind the engine.

This combination . . . the most dependable engines in the field backed by the best service organization in the world . . . is your assurance that when you deal with Stewart & Stevenson Services you get the best! Yes, you have the added satisfaction of knowing that when you buy from Stewart & Stevenson Services your engines are guaranteed to do the job they are recommended to do. The integrity and reputation of Stewart & Stevenson for fair dealing is recognized the world over. Contact your nearest Stewart & Stevenson representative today for complete details on your marine power requirements.

STEWART & STEVENSON SERVICES, Inc.

Main Office and Plant: 4516 Harrisburg Blvd., Houston 11, Texas. Phone WOodcrest 9691

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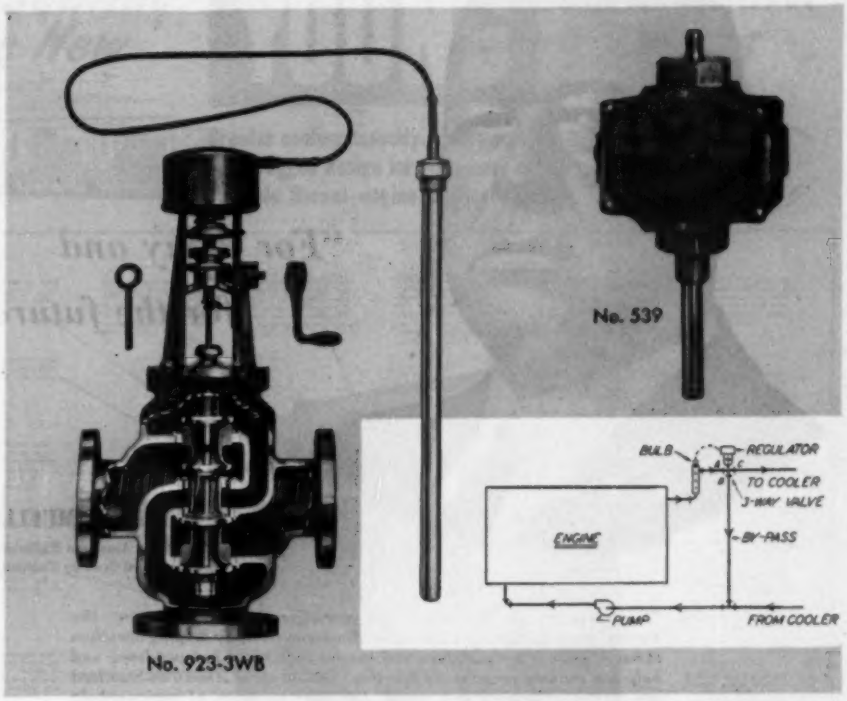

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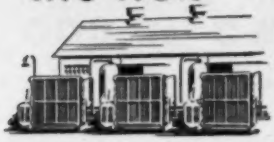
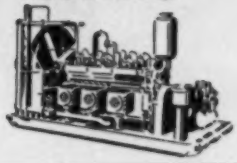
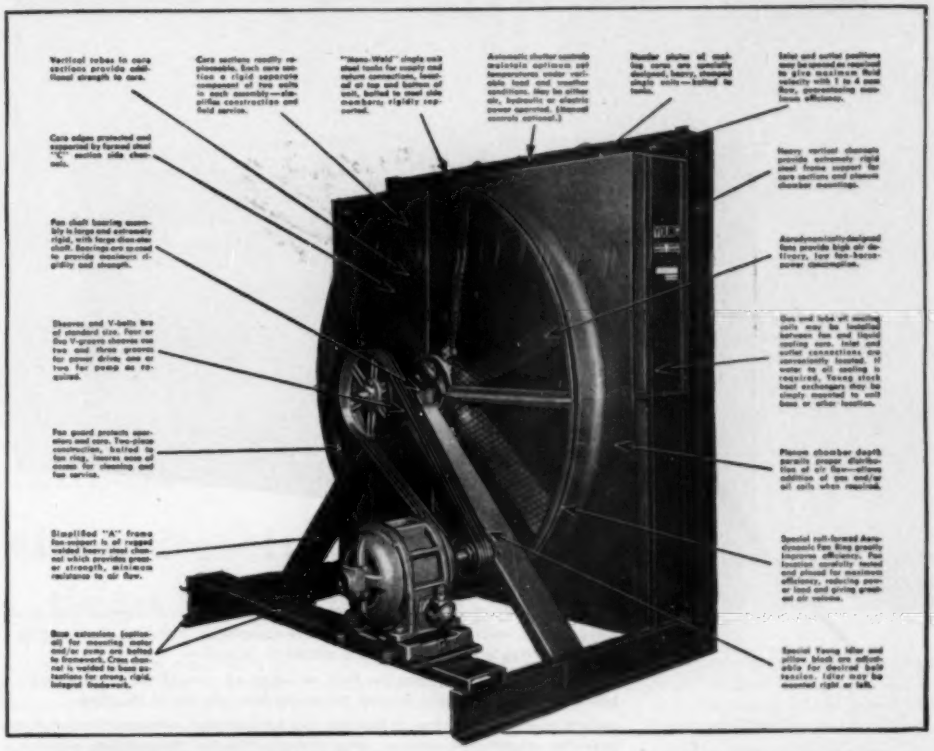
Editor—DIESEL PROGRESS

Presenting the New YOUNG Jacket Water Coolers



Greater cooling capacity...more compact, rugged design for stationary or portable Diesel engine applications





Vertical tubes in core sections provide additional strength to core.

Core sections readily replaceable. Each core section a rigid separate component of two units in each assembly—stabilizes construction and field service.

"Mono-Weld" single unit steel tanks for supply and return connection, located at top and bottom of unit, bolted to steel side members, rigidly supported.

Automatic shutter controls regulate optimum air temperatures under variable load and weather conditions. May be either air, hydraulic or electric power operated. (Manual controls optional.)

Number plates of cooling cores are specially designed, heavy, corrugated single units—bolted to tanks.

Inlet and outlet positions may be spaced as required to give maximum fluid velocity with 1 to 4 pass flow, guaranteeing maximum efficiency.

Core edges protected and supported by formed steel "L" section side channels.

Heavy vertical channels provide extremely rigid steel frame support for core sections and plenum chamber mountings.

Fan shaft bearing assembly is large and extremely rigid, with large diameter shaft. Bearings are spaced to provide maximum rigidity and strength.

Aerodynamically-designed fans provide high air deliveries, low fan-horsepower consumption.

Sheaves and V-belts are of standard size. Four or five V-grooved sheaves are two and three grooved for power driving one or two fan pumps as required.

One and tube oil cooling units may be installed between fan and liquid cooling core. Inlet and outlet connections are conveniently located. If water in oil cooling is required, Young stock heat exchangers may be simply mounted to unit base or other location.

Fan guard protects operator and core. Two-piece construction, bolted to fan ring, insures ease of access for cleaning and fan service.

Plenum chamber depth permits proper distribution of air flow—allows addition of gas and/or oil coils when required.

Simplified "A" frame fan-support is of rugged welded heavy steel channel which provides greater strength, minimum resistance to air flow.

Special roll-formed Aerodynamic Fan Ring greatly improves efficiency. Fan location carefully tested and placed for maximum efficiency, reducing power load and giving greater air volume.

Base extensions (optional) for mounting motor and/or pump are bolted to framework. Cross channel is welded to base extensions for strong, rigid, integral framework.

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Young designing permits the addition of lube oil and/or gas cooling coils between the water cooling core and the fan, making possible a lower fan-horsepower requirement.

Catalog No. 1351 plus ratings, specifications and other details will be furnished upon request. See your nearest Young Distributor, or write direct.

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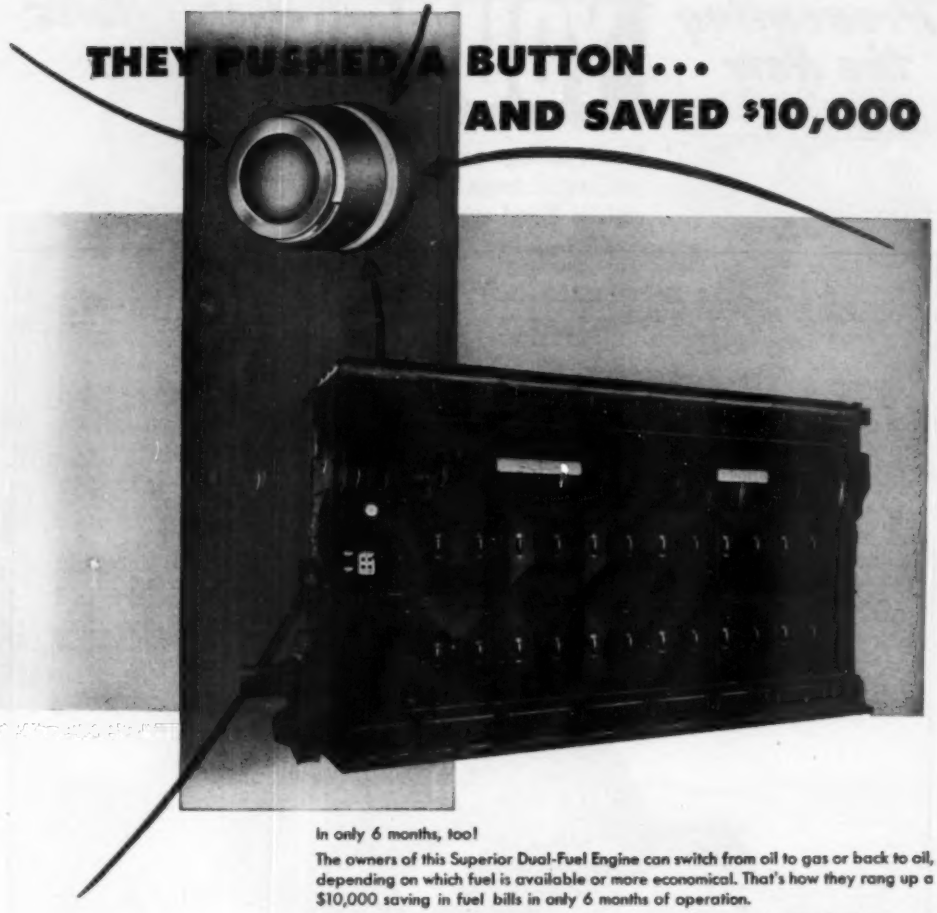

In only 6 months, too!

The owners of this Superior Dual-Fuel Engine can switch from oil to gas or back to oil, depending on which fuel is available or more economical. That's how they rang up a $10,000 saving in fuel bills in only 6 months of operation.

Owners of these engines can run them on diesel oil, natural gas or waste gas. A push of a button promptly switches the engine from one fuel to the other.

Maintenance costs stay low on Superior and Atlas engines, whatever the fuel. Extra precision, conservative ratings, extra strength and the dependable, economical 4-cycle principle combine to make a Superior or an Atlas Engine your best buy over the years. Continent-wide parts and service facilities assure you of dependable service from your engines. A combined 100 years of Superior-Atlas engineering and engine-building are your assurance of the best design and construction.

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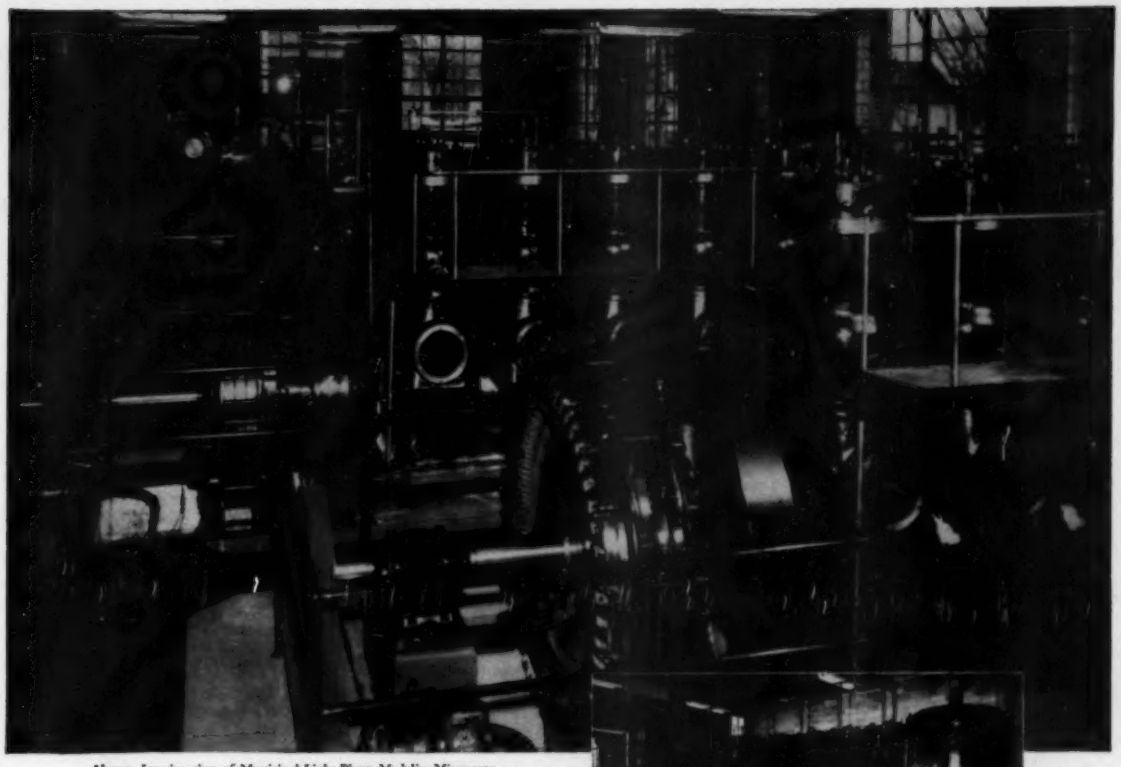

Above: Interior view of Municipal Light Plant, Madelia, Minnesota.

Right: T. C. Splinter, Superintendent (at right), checks performance of big diesel while S. C. Field of Standard Oil's Mankato office looks on.

Ailing diesels get clean bill of health

As power demands grew, so did trouble for the Municipal Light Plant of Madelia, Minnesota. Carbon formed rapidly in the plant's three diesel engines. Ports required cleaning every two to three weeks. Diesels had to be shut down frequently to free stuck rings and remove varnish from cylinder walls.

T. C. Splinter, plant superintendent, put the problem to a Standard Oil lubrication specialist. The lubrication specialist pointed out that the straight mineral oil used in the engines was not able to stand up under the severe conditions of operation. He recommended a switch to STANDARD HD Diesel Oil.

This heavy-duty lubricant made a clean sweep of the troubles. In four years of hard service, STANDARD HD has kept engines clean and rings free. Port carbon has been reduced to a minimum. Engines are now operated up to 8,800 hours before they are inspected or cleaned. Maintenance costs have been trimmed 30% to 40%.

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Diesel Oil

A 1400-hp diesel engine was added to the plant in 1948. This makes a total of 2,840 diesel horsepower now protected by STANDARD HD for this plant.

The experience of T. C. Splinter indicates how you can reduce maintenance costs with STANDARD HD Diesel Oil. A Standard Oil lubrication specialist will be glad to help you obtain maximum benefits from this superior diesel oil.

Arrange for his visit, now, by phoning your nearby Standard Oil Company (Indiana) office . . . or write: Standard Oil Company (Indiana), 910 So. Michigan Ave., Chicago 80, Illinois.

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A Chest X-Ray is the first step toward detecting tuberculosis in its early stages. And in its early stages it can be cured with the least loss of time from work.

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Between the ages of 15 and 34, tuberculosis leads all other diseases as a cause of death—although at no age are you safe from TB. Yet, if everyone does his part by getting a Chest X-Ray periodically, and the majority of cases thus discovered are followed up, we can eliminate TB entirely as a public health hazard!

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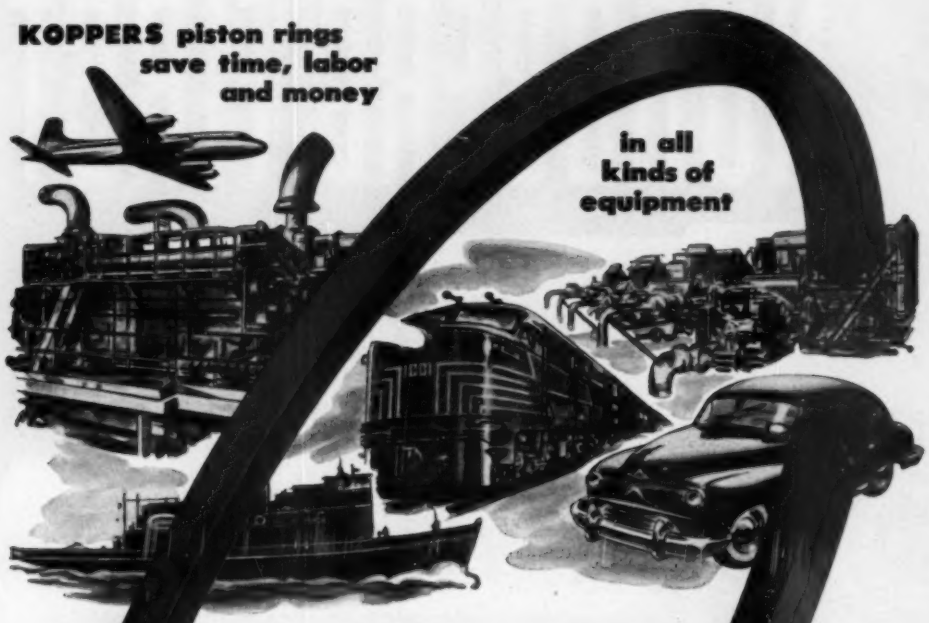

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*VAN DER HORST PROCESS

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EDITORIAL AND PRODUCTION OFFICES

816 N. La Cienega Blvd. — Los Angeles 46, Calif.

NEW YORK 19: Robert N. Young, 2 West 45th Street, MUrray Hill 2-7333

LONDON E.C. 4: E. H. Deddrell, 342 St. Paul's Corner, Ludgate Hill

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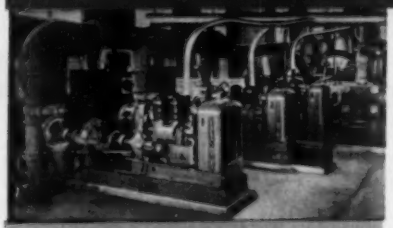
DIESEL PROGRESS for July, 1951, Vol. XVII, No. 7. Published Monthly by Diesel Engines, Inc., 816 N. La Cienega Blvd., Los Angeles 46, California. Tel. BRadshaw 2-6273. Subscription rates are $5.00 for U.S.A. and possessions. All other countries $7.50 per year. Subscriptions may be paid the London office at £2-12s-6d per year.

DIESEL PROGRESS is indexed regularly by Engineering Index, Inc.

FRONT COVER ILLUSTRATION

READY TO SERVE IN CIVIL DEFENSE



Water Department of Pontiac, Michigan, has for standby service three 6-cylinder GM Diesel engines connected to pumps with a total capacity of 378,000 gallons per hour.

Chicago, Philadelphia, Houston and other cities depend on GM Diesel-powered fireboats for waterfront and harbor protection. These boats, with 6-, to 12-thousand GPM capacity, are equipped to pump into city mains in emergency.

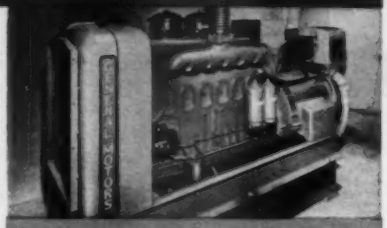
Portable Generating Sets up to 200 KW capacity, powered by compact GM Diesel engines, can be mounted in trailers. Mobile units like this can serve emergency requirements of small communities.

To ASSURE standby power for water supply, lighting and communication in emergencies, many of America's cities, public utilities, defense industries, hospitals, airports and radio stations rely on General Motors 2-cycle Diesel power. Pictured here are a few of the ways these high-powered portable Diesels help safeguard vital public services.

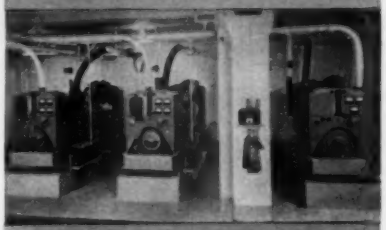
★ ★ ★ ★ ★

General Motors Diesel engines are built in a wide range of models to meet all types of power needs—Series 71 engines, 2 to 24 cylinders, 32 to 800 H.P. and 6-cylinder 110 engine, 275 H.P. For specific information on how these compact, portable Diesels can fit into your Civil Defense plans, *write, wire or phone.*

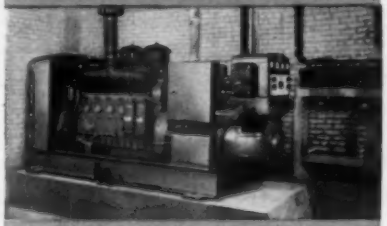
Diesel Brawn without the Bulk



Radio Station WMPS, Memphis, Tennessee, installed this 50 KW GM Series 71 Diesel generating set for emergency standby use. This auxiliary picks up full broadcast load within 3 seconds if power supply drops below a critical point.



Telegraph Offices has GM Diesel standby electric generators for emergency service. Similar sets of from 20 to 200 KW can take up normal voltage load of hospitals, defense plants, public buildings and small communities.



Over 800 U. S. Telephone Exchanges are equipped with GM Diesel Electric generator sets, providing a reliable source of emergency power to insure communications.

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A BIG LITTLE RAILROAD

Spokane, Portland & Seattle Railroad Emerges As One of Nation's Finest Shortlines 100,000 Diesel HP Moves 50 Per Cent Of Its Total Traffic!

By CHAS. F. A. MANN

UP in the Pacific Northwest is one of the unique Shortline Railroad systems in the whole USA . . . unique in that practically every good and bad superlative that can be tacked onto a railroad in its entire history, applies here! The SP&S, as it is universally known, began life as a stiff competitor of the old Oregon, Washington Railroad & Navigation Company—now part of the Union Pacific—when cantankerous old Jim Hill was sitting up nights trying to figure ways to lick equally cantankerous E. H. Harriman. From the start, it was a scheme to get the Northern Pacific's ancient squatters rights, as a credit base for a family company to get the Great Northern into Portland. At the turn of the century, the N.P.'s emergence from bankruptcy collided with the new G.N. owner-influence, and from it sprang a 1000 mile network of single track to give both the Hill lines entry direct to Portland, and give Mr. Hill a chance to trim the Harriman-dominated Southern Pacific by means of a fabulous, short-lived steamship line from Astoria (Flavel) to San Francisco. You took the train at Portland for Flavel, rode twin high-speed counterparts of the old steamer Leviathan, and beat the S.P. into San Francisco at less fare! World War I broke this up, and what was left became the *S.S. H. F. Alexander*, of Coastwise fame, and its twin was sunk by a torpedo in the North Atlantic. The SP&S, or North Bank Line, played havoc with the Union Pacific's domination of Portland. The SP&S branch lines were actually trunks of a network of main lines laid 45 years before their historic need could make them profitable. The branch line to Bend, Oregon, at first built to tap the pine lumber region there and dilute the competing Union Pacific, eventually became a part of the new mainline to California, dreamed up by the Western Pacific and Great Northern. The short branches out of Portland originally fed logs to Portland sawmills. These, and the old Oregon Electric Railroad to Eugene, that at one time had 100 trains per day running over it, became a mighty, tho relatively short, freight mainline feeder for both the SP&S and the parent GN-NP owning systems. The big bridge across the Columbia at Vancouver collects toll on every wheel that enters the State of Washington from the South, on three railroad systems! The Astoria line still is a monopoly on lumber and fish products to far Northwestern Oregon.

Through the years the economics of the Northwest have left the SP&S, after its once huge passenger traffic declined, in a deplorable financial condition. When it ran out of money, its twin parents forgot to collect bond interest; management fees and finally, loaned it money for taxes, and, way down at the bottom, loaned it without charge, a full set top management personnel, a lot of discarded lightweight locomotives and much second hand railroad track—just to keep it alive. For years, back in St. Paul, the presidents of the Northern Pacific and Great Northern are supposed to have taken each other out to lunch the day before the annual meeting of the SP&S and flipped a coin to see who would be given the honor of being president of the most busted railroad in the West!

Fifteen years ago when the lumber industry began to migrate from Western Washington to Western Oregon, as their timber ran out and market conditions made it possible to pay stiff Oregon prices

for timber, the rejuvenation period began for the Western end of the SP&S. The weed-covered Oregon Electric trackage began to haul freight over the old Interurban rails. Industries moved in, and hundreds of spur tracks were built. After 1927, when the Great Northern began its California Mainline operation via Bend, Klamath Falls, Beiber, Keddie and Marysville, the Eastern end of the SP&S began to run in the black. Today, with a system-wide rebuilding and repowering program nearing completion, the SP&S emerges not only in exceptional condition physically, but financially as well, and its parental management has now given way to almost completely independent operation!

To prove it, the re-born public relations and gay advertising program stresses it as "The Northwest's Own Railroad" . . . Everybody from Executive Vice President and General Manager E. B. Stanton, one of the West's most youthful railroad executives, down to the brakies and mechanics in the big new diesel shops at Vancouver, across the river from Portland, have caught the new spirit of progress and rejuvenation, and the race is on to make not only the short-haul and passenger train operations pay off, but out skin competition, including Portland's huge, efficient trucking industry, on the long haul stuff to the East and to the South, that travels the full length of the SP&S system.

100,000 diesel horsepower moves 50% of total system traffic! Steadily, for the past 4 years, the Company has quietly "Gone diesel," not in a ballyhoo-style, but carefully and systematically, and it has leaned heavily toward the Alco side straight through. Once in its history, large batches of lightweight ex-Great Northern "teakettle" steamers were unloaded on the Company . . . Then followed more of the larger type Great Northern steamers. Since way back when, largely because of cheap fuel oil at Portland, the Company, with no coal mines or coal trains, has been an oil burning railroad. Because all but the line to Bend is largely water-level grade, 85% of the entire SP&S could lope along even in a depression period, with lightweight steam power, light tracks, no automatic block signals and even ancient steam yard switchers, without creating too much of a bother to its already traditional red-ink financial status or the shipping public. For years the 125 mile electrified line to Eugene, with its converted passenger power handling short slow freight trains did very well. Until diesel came along and made it possible to chop power costs per 1000 gtm's exactly in half!

The readers of DIESEL PROGRESS will recall that the Spokane, Coeur D'Alene & Palouse trolley line down to Moscow, Idaho, and the Oregon Electric line to Eugene both were among the first long-line electric systems to see the light with diesel road-switchers and sell their copper to the scrap dealers. From the date the Oregon Electric subsidiary of SP&S converted to diesel, the steady upward curve in System profits began. The SP&S at all times had had the complete motive power background of two of America's largest Transcontinental railroads—each of whom owns one-half the common stock of the SP&S, incidentally—we refer to the Northern Pacific and the Great Northern. The N.P., with its "world's cheapest" strip coal mine fuel, and gigantic Yellowstone steam locomotives; the Great Northern with its Oil Belt steamers, and its Cascade Mountain electrification —cross section every type of steam power since 1890. Both parent companies have gone diesel in a large way, both swiftly turning 100% diesel on everything West of Montana. This background has given rise to the unique situation that the SP&S has some of the finest big steam power ever built, and all less than 10 years old. It has a few of the largest 4-8-4 heavy duty oil fired steam power for fast passenger service and a modest fleet of giant 4-6-6-4 Alco steam freighters, which it intends to wear out simply because they do a fine, fast job and their operating costs are still level with diesel replacement equalized against the investment in steam. The easy water grades on the main line between Portland and Spokane make it possible to get the maximum utilization out of the steamers, where diesels can replace the short light branch line services and the extra heavy mountain service between Wishram, on the Columbia, and Bend, Oregon, on the California line.

On the Portland-Astoria line, which is water level all the way, the new track and new ballasted line carry lightweight diesel road switchers and single unit passenger power, while 2-unit 3,000 hp. freight diesels serve the entire Eugene line and the big 6,000-h.p. Alco 4-unit freights run the hill to Bend, as well as the fast heavy freights—up to 7,000 tons—to Pasco and Spokane. On the Portland-Pasco-Spokane run the 4-unit freight diesels work interchangeably with the big Alco articulated steamers. On the Oregon Electric segment to Eugene, and its three important timber-tapping branches into the foothill country, the diesel operation calls for 3,000 hp. 2-unit freighters to pull the mainline tonnage trains, and the Alco Road Switchers to pull short local freights on the branches, and do road switching at the host of industrial spurs along the

SP&S Freight train westbound along Columbia River, 3 miles east of Bingen-White Salmon, Washington.

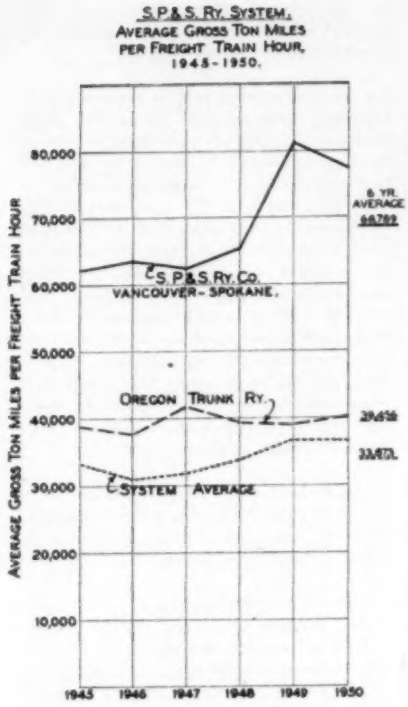
way. The Goldendale Wheat timber branch that bleeds off the main line at Lyle, east of Portland, is a diesel road-switcher operation too.

The big SP&S terminal yards in Portland and at Vancouver, across the river, are rapidly "going diesel," to the point where all steam facilities at these two big yards will be turned to the scrap pile by the end of 1951. The sagging and sprawling old steam shops have given way to a modern concrete diesel garage, at the North end of the Vancouver yards. Vancouver is the chief operating base for the System because of the fact that the Puget Sound joint-user rail line from Seattle and Tacoma joins the SP&S tracks to cross the big Columbia River Bridge at Vancouver, and also at this point the main line to Spokane and at Wishram, south to Bend and California, joins. The Astoria line's through freight traffic leaves Portland at Linnton and comes across the river to Vancouver yards where all through freights are made up.

Originally starting with 2-660 Hp. Alco Switchers, No.'s 10 & 11 for the Vancouver-Portland terminal work, the motive power roster has grown to the following diesel motive power:

Alco Switchers—660 Hp.	2
Alco Switchers—1000 Hp.	9
Baldwin Switchers—1000 Hp.	5
EMD Switchers—1000 Hp.	3
Alco Road-Switchers—1000 Hp.	6
Alco Road Switchers—1500 Hp.	3
Alco Road Switchers—1600 Hp.	4
EMD Passenger—2000 Hp.	1
EMD Passenger (FP)—1500 Hp.	3
ALCO Freight Units—1500 Hp.	34

SP&S Ry. Co. new diesel electric locomotive shop, Vancouver, Wash., built in 1949. Also latest SP&S diesel electric locomotive No. 868, 4 units, 6400 horsepower.



SPOKANE, PORTLAND AND SEATTLE RAILWAY SYSTEM

Comparative statement of cost of operating steam and diesel propelled trains

YEAR——1950

Item	Steam	Diesel	Total
Freight-Train Costs—Dollars			
Fuel	$ 605,558	$ 367,070	$ 972,628
Enginemen	389,232	416,768	806,000
Trainmen	570,915	583,350	1,154,265
Enginehouse	105,969	96,764	202,733
Other loco. supplies	59,773	54,580	114,353
Train supplies and expenses	127,535	144,626	272,161
Total	$1,858,982	$1,663,158	$3,522,140
Locomotive repairs	553,347	243,786	797,133
Cost per 1000 gross ton miles—Cents Excluding Loc. and Tenders			
Fuel	30.3	16.5	23.0
Enginemen	19.5	18.7	19.0
Trainmen	28.5	26.1	27.3
Enginehouse	5.3	4.3	4.8
Other loco. supplies	3.0	2.4	2.7
Train supplies and expenses	6.4	6.5	6.4
Total	93.0	74.5	83.2
Locomotive repairs	27.7	10.9	18.8
Gross ton miles—Thousands Excluding Loc. and Tenders	Steam $120 T 2,000,124	Diesel $0.85 H 2,230,959	4,231,083

On Order for summer delivery are 3-1200 hp. EMD Switchers and 2 ALCO 1600 Hp. Road-Switchers or a grand total of 99,920 Diesel Horsepower!

In operation the four diesel passenger units are unique in that the single 2000 hp. EMD passenger unit normally makes a 760 mile daily round trip between Portland and Spokane pulling the Empire Builder connecting Portland train No.'s 1 & 2 all by itself! In case of a heavier consist of coaches, 2 of the 1500 EMD 1500 Hp. Fp units are used, or a 1500 h.p. Fp hooked to the 2000 hp. EMD unit. This gives great flexibility to the motive power setup for pulling the fast Empire Builder connection—a 2000 or a 3000 or a 3500 hp. passenger diesel hookup available on a moments notice. On the Pasco morning local, and the daily round trip from Portland to Astoria and Seaside, the 3-1500 hp. passenger units can be used singly to pull these light trains, or one of the road-switchers with heating boiler used on the Astoria local if the extra 1500 hp. EMD unit is needed for Trains 1 & 2. Thus a mere 4 diesel units operate the primary passenger service for six trains! The heavy mail and express night train to Spokane and the Bend connection still use the heavy steamers, which, because of schedules, must tie up all day at terminals. However, on the Wishram-Bend mixed night trains No. 102 & 103, a 1600 hp. Alco Road Switcher can handle up to 30 cars and maintain schedule. On the Eugene-Portland line 3-3000 hp. 2 unit Alco freighters and 2-1600 hp. Alco Road-Switchers are regularly assigned, while the 6000 hp. and 6400 hp. 4-unit Alco freights all operate in a pool between Vancouver and Spokane and Wishram & Bend.

The operating picture. In January of this year, in the dead of winter, on the Vancouver-Spokane freight operation the average gross ton miles per freight train hour hit 83,621—a phenomenal statistic. In September, last year, this climbed to the almost unheard of total of 95,805, one of the high records for any railroad in the country except ore trains moving in huge blocks. The September average speed per freight train hour, rose to 24.4 miles per hour and it was 21.9 per hour in January of this year. These records made of course, with the 6,000 hp. Alco diesels. For the same two months the Oregon Trunk line to Bend, with a 1.5% ruling grade in the Des Chutes Canyon, the figures for September were 20.5 miles per hour speed and 45,000 gtm per freight train hour. The January 1951 record was 19.4 mph and 40,476 gtm per train hour. So what????? Well, the 1942-1943 average with steam for the System was only 14.5 mph and 45,000 gtm's, and way down to 14 mph and but 30,000 gtm's on the hilly Oregon Trunk! Diesels have improved road operation by nearly fifty percent over the showing made with "modern" steam power!

For the whole system taken together, the worst averaged with the best of operating conditions, the total figure has improved fifteen percent since diesels were installed. And on the Vancouver-Spokane speedway this improved nearly 20% since diesels were installed. The freight tonnage on this whole System os the best example of typically Western transportation by rail. From the Eugene line the movement of forest products (lumber, millwork, pulp and paper) and processed raw agricultural products, particularly fruit, is heavy, with seasonal peaks. The down-haul is mostly Eastern manufactured goods. On the Astoria line it is forest products and fisheries products. On the Vancouver-Spokane line it is a Transcontinental fast, competitive tonnage haul with way back East as the main destination. Out of Pasco of course is a heavy traffic incident to developing activity at the Hanford Atomic works, while on the California line thru Bend, it is a two-way swap between California and the Northwest, with heavy fruit movement North for points far into Canada via Vancouver and Spokane, with most of this traffic interchanging with other railroads. Diesel is doing it cheaper, as the final acid test figures for 1950 will reveal below. Diesel does IT 35 cents per 1000 gross ton miles than with steam.

In the final table above, it is unique that almost exactly half the tonnage of the whole SP&S last year moved by steam and half by diesel. The four billion gtm's moved by SP&S are a perfect, accurate laboratory study in railway motive power economics.

SP&S freight train with 109 cars northbound crossing Crooked River bridge near Mile Post 126 between Terrebonne and Opal City, Oregon—Oregon Trunk Ry.

PERSHING SQUARE DOES A DIESEL DIVE

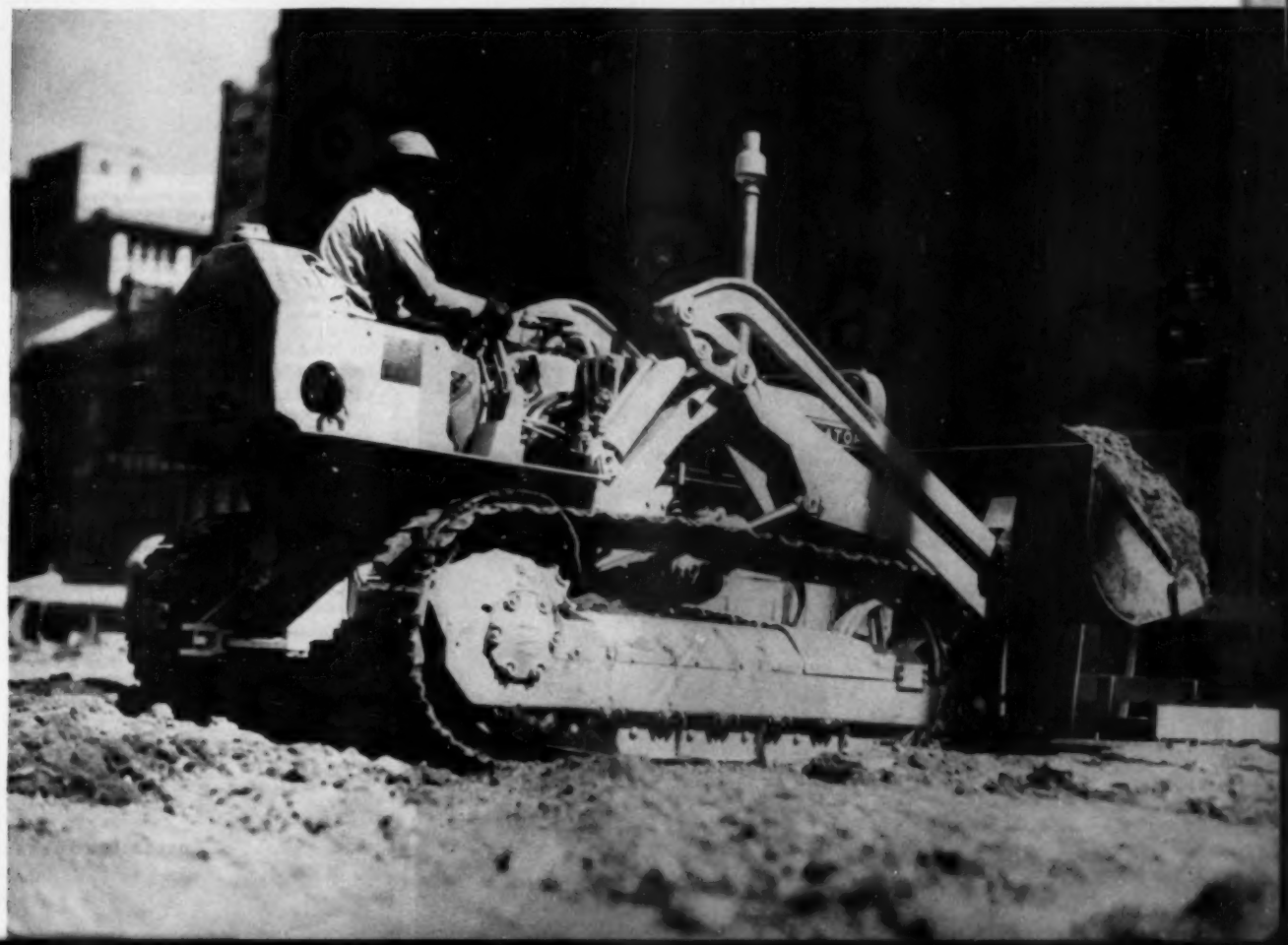
Los Angeles Hub Gets an Underground Garage by Moving 400,000 Yards of Dirt and Addition of 35,000 Yards Concrete with 2300 Tons of Steel

By F. HAL HIGGINS

PERSHING Square, crossroads of the booming business center of Los Angeles for the past half century or more, is getting a new and modern look from the hands of a famous group of "joint contractors and coadventurers." In brass tack facts as set forth by the contractors' spokesman when the writer called on officials to tell him what was doing, by whom and how, Mr. A. R. MacPherson answered in the terse language of his native Scotland and the engineering world: Name of contractors—Ford J. Twaits Co., and Morrison-Knudsen Co., Inc., and T-S Construction Engineers, Inc. as Joint Contractors and Coadventurers. Amount of dirt to be moved—400,000 cubic yards. Auto parking capacity—approximately 1,700 cars. Completion—Early in 1952. Dirt moving contractor—C. G. Willis & Sons, Inc. Total concrete—35,000 cubic yards. Reinforcing steel—2,300 tons. Designed by—Stiles Clements & Associated Architects and Engineers. Consulting Engineer—Murray Erick and Associates.

With the job just getting under way in front of the visitor's hotel while he was in the City of the Angels for four days earlier this year, he took occasion to walk over and take a look about twice a day to catch several of the digging diesels in action as they began lifting the lid on the famous old park that he had always seen swarming with humanity of all brands of religion, and a free spouting of soap box oratory to any and all who would pause and listen. With the trucks, tractors, shovels, cranes, and power augers starting to work, broken concrete and brick walks, dry fountain and goodbye-waving banana palms accented the changing times and city. A check on the diesels already on hand showed GM in both crane and Allis-Chalmers HD5 tractor with Baker bulldozer sent over from the Shaw Sales and Service Co.; Cummins in a big truck that hauled the 7-ton concrete pillars to go into the new structure; Caterpillar D6 and D8 with Traxcavator and bulldozers; another D4 with front scoop appeared to replace the smaller D2 that was parked in the center of the square the first day. And the Buda-powered shovel that was already dug into a pit of 10 to 12 feet for easy digging its way across the square to excavate the dirt into waiting trucks that operated only at

Cat D4 with Traxcavator front shovel replaced smaller D2 to work in close quarters around the big holes augered for the steel shells set in the holes to be filled with concrete for foundations.



night when traffic was down to a minimum to disrupt the traffic as little as possible.

All day long a fleet of old Army trucks with power augers was busy digging 36-inch holes around the south and east sides of the square. Into these holes steel shells are dropped by the GM-powered crane. The crane was also doing an unloading job of 7-ton concrete and steel pillars for the new structure. The tractors with front-lift shovels were doing neat work in cleaning up around the bored holes. All diesel operators seemed appreciative of their equipment and knew how to use it for top efficiency and lowest costs. And the Standard Oil of California tanker serviceman was caught in the hole with his truck backed up to the Buda-powered shovel early one morning after the shovel had finished its night dig and was down for the daylight hours. "Yes, I service all this equipment for this job," said the driver as he unreeled a hose and climbed up on the rear of the shovel to push the nozzle of his tanker into the fuel tank and fill it up for another night's work. It was a good time to see a group of top contractors working together to do such a concentrated job as this. In a few days more the dirt moving would be completed and the shovel and tractors gone to other jobs.

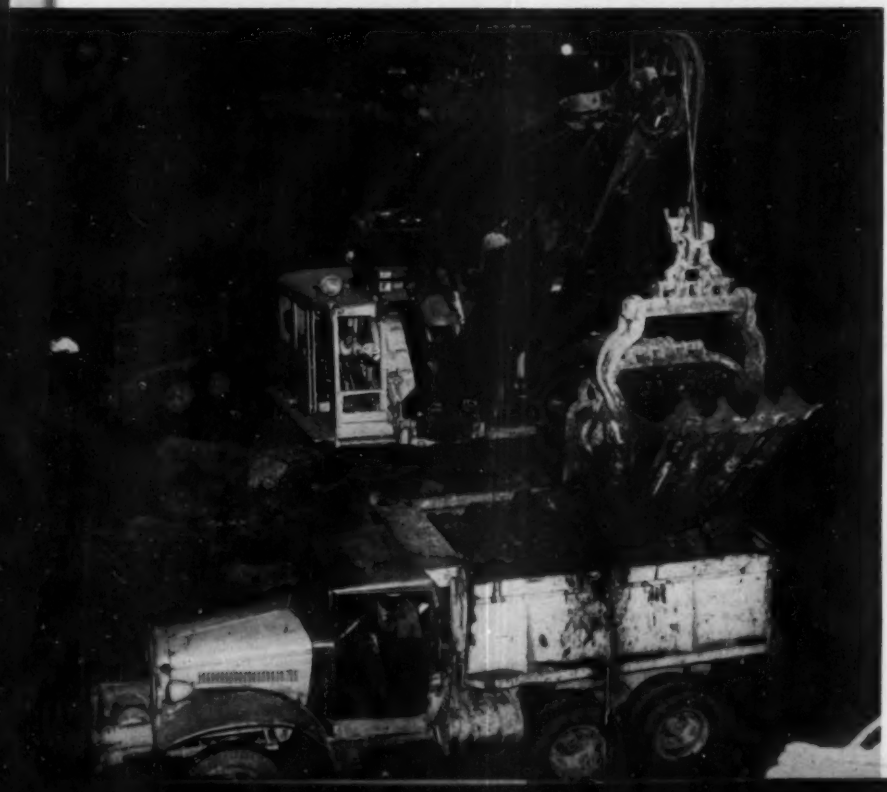
"Plans for the garage structure are being made by Stiles Clements Associated Architects & Engineers. In general, the plans call for three floors, approximately 2000 car capacity at one time, which will make it the largest underground garage in the world. From a traffic standpoint, the garage will provide a much better traffic design than any other now in use in that all automobile ramps in and out of the garage will pass under the sidewalks thus avoiding any possibility of collision between pedestrians and automobiles, and at the same time speeding up the movement of automobile traffic which in similar garages is constantly impeded by pedestrians crossing on sidewalks. All exterior ramps leading into the garage are nearly one block in length thus providing an enormous storage capacity for automobiles waiting to go into the garage, thus taking them off the streets. Interior ramps are circular in design and permit driving automobiles from any incoming ramp down to all floors of the garage.

"STATISTICS: Estimated cost of the garage structure including the new park is $5,000,000. This amount is all private capital, no portion being provided by the city or any other governmental agency. Financing was accomplished by a first mortgage loan from the Equitable Life Assurance Society, a second debenture mortgage bond sale to local business interests and the purchase of common stock by the syndicate, City Park Garage, Inc. A total of $250,000 of second debenture bonds were purchased by downtown business and property owners through the activities of the Downtown Business Men's Association, who obtained the agreement to purchase these in a whirlwind ten-day campaign.

"Approximately 200,000 cubic yards of material, which is equivalent to 270,000 tons, will be excavated. About 23,000 cubic yards, which is equivalent to 31,000 tons, of good soil will be brought back and placed on top the garage roof to provide a satisfactory park surface. Approximately 50,000 cubic yards, or 105,000 tons, of reinforced concrete will be used. Construction will take from 12 to 18 months. With the 2000 car capacity it is anticipated that from four to five thousand cars will be parked daily when the garage is in full operation. Ventilation will provide a complete change of air at least once every six minutes. The lease is for 50 years at the end of which time the structure must be returned to the city park department who, thereafter, will be able to operate it or lease it for operation on behalf of the city.

"The approximate depth of the garage structure between the third floor and roof is 29 feet. Each floor represents 210,000 square feet of floor area or a total of 630,000 square feet. The park location is the ideal spot for a large garage, as determined by numerous surveys made by experts. It is surrounded by four excellent thoroughfares of which Fifth and Sixth are one-way, facilitating traffic to and from the west particularly; while Hill and

Daytime view of the Pershing Square garage job as it got underway. The Diesel shovel (Buda) and tractor with bulldozer (Cat D8) are stopped till night shift when dirt is excavated and hauled out. At right edge of picture is the Allis-Chalmers HD5 (GM Diesel). Farther back on same right edge is seen the Cummins-powered White truck.



Buda-powered shovel at work on the night shift in Pershing Square. A Cat D8 with bulldozer also works in the hole to sweep up and keep the floor neat and level for the trucks.

Night bite! Buda Diesel in this power shovel caught at work on the Pershing Square garage job. C. G. Willis Sons shovel.

Olive give excellent access from the north and south. All four streets connect directly, or nearly so, to important freeways now being constructed on the north and west sides of the Downtown District. Additional freeways to be constructed eventually on the east and south sides of the District will, undoubtedly, provide similar connections for the four streets mentioned. Local and national studies indicate the maximum number of cars leaving the garage at any time would be during the evening peak hour, from 4:45 to 5:45 p.m., when approximately 720 cars would leave. This amount of traffic distributed on four streets is less than that of a 500-car garage with an exit on a single street only."

Diesel team at work on the construction of the garage at Pershing Square: Cummins-powered truck hauls steel foundation casings onto job from which diesel-engined (GM) crane lifts them up to drop near where it will later pick them up again and drop into holes drilled into ground for foundations. Crane is a Bucyrus Erie 38B model.

"ASHLAND" TEN YEARS OLD

With Speed and Strength, This Very Popular Diesel Towboat Pays Her Own Way on Our Inland Waterways

By DAVID I. DAY

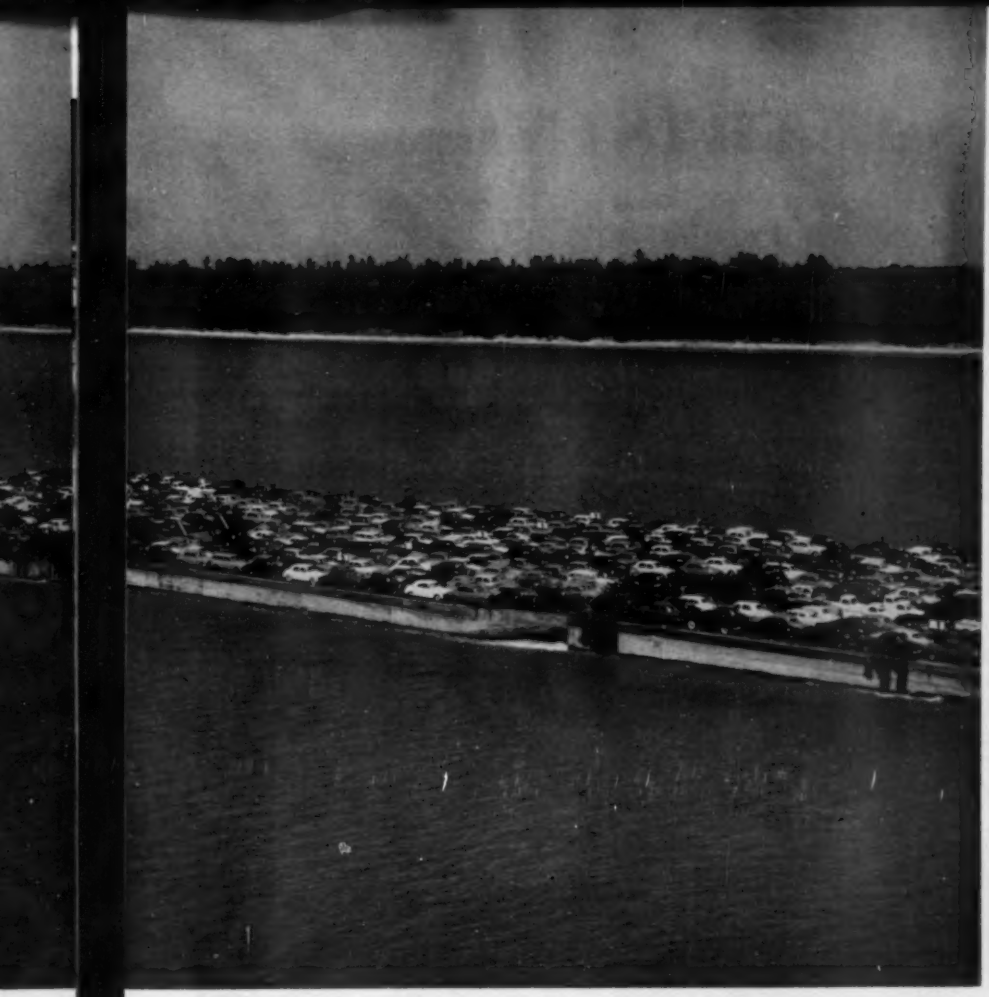
IN the permanent river records we learn that the *Ashland*, the popular diesel towboat operating the Ohio and Mississippi Rivers, was built at Chicago by the Calumet Shipyard & Dry Dock Company in 1941. By that calculation, she is now rounding out here first ten years of service too. However, this is only a part of the story. In the old days of her career, from 1941 to 1948, this steel hull, twin propeller pusher was 145 feet in length, 31 feet in beam and 7.3 feet in depth and had only 1610 horsepower.

The officials of the Ashland Oil and Refining Company, the owners of this remarkable towboat, are not ashamed of her first seven years pushing crude oil up from the lower Mississippi to the company's unloading terminal at Catlettsburg, Kentucky. But they are, however, much prouder of her achievements since she traveled to the yards of the Dravo Corporation three years ago. At these famed shipyards at Neville Island below Pittsburgh, the workmen promptly took the towboat out of water and set to work converting her into what is for all practical purposes, a new boat. When she left the yards she was so vastly improved and so noticeably different that she was provided with a brand new log book. In the minds of the rivermen from New Orleans to Pittsburgh, from Cairo to St. Paul, the boat dates back only to June 22, 1948 when Dravo put in their finishing touches.

The installation of the pair of 1440 hp. General Motors diesel engines wrought the greatest change. They came from an LST on the Pacific coast, being shipped directly to Dravo from San Francisco waters. They increased the *Ashland's* pushing power by approximately 250 per cent. "And", remarked an Ashland official in late March, "she emerged from the yards at Neville Island almost as much improved in the matter of maneuverability. She had 71½ feet of additional hull length added. From that day, it is the studied conviction of many smart rivermen that the *Ashland* is the best boat on the inland waterways. (See DIESEL PROGRESS, page 60, May, 1949). As to which is the best boat among hundreds is a matter of purely personal opinion. But it is significant that those loudest in their praise of the sturdy flagship of the Ashland oil fleet are the officers and men who man this craft and have seen her daily performance at close range. And some of these fellows have been employed on scores of towboats.

To the casual visitor, there is one more thing about the *Ashland* that is truly astonishing. It probably carries less hull vibration than any of the more powerful river towboats. It is betraying no secret to say that we expect plenty of vibration on the average diesel pusher. Before 1948, we noticed this on the *Ashland*. But since her working over at the hands of Dravo craftsmen something has happened to her. You can scarcely feel any vibration at all. Even on the main deck aft where we usually find the vibration most disconcerting, you can, on this boat, scarcely feel the pounding of the engine and propeller at all. The story is told that this improvement was one of the first noted after the boat was repowered. It is said that Paddy O'Laughlin, Dravo plant superintendent, demonstrated the lack of boat "quiver" by balancing coins of various sizes on the deck aft of the propellers while the vessel was under way.

Tested back of 14 loaded barges of coal and gravel, the barges arranged to give the greatest water resistance, the boat traveled 5.98 miles per hour upstream and 6.9 miles per hour downstream. This proved she should experience no difficulty in pushing up from Louisiana her 15 barge integrated tow



of crude oil for the company refineries. At full upstream speed, the boat's thrust registered 60,000 pounds. Moored in stationary position at the river bank, the propellers turning 700 revolutions per minute, the thrust registered was 88,000 pounds. This made the *Ashland* the most powerful towboat ever tested up to that time at Dravo yards. The most startling improvement in the boat, so far as the practical rivermen were concerned, was the extreme maneuverability of the craft under all river operating conditions. The *Ashland* first made newspaper headlines in this regard shortly after the new engines were installed. At Sewickley, Pa., on the Ohio, the boat completely and very easily turned her tow completely around in the channel and made off upstream as if nothing had happened. In tests with other boats under similar circumstances, the tow had been necessarily "jackknifed" into two sections in order to go back up the current. The power and handling qualities of the *Ashland* on a job of this sort, it is estimated, saves about two hours of time. Handling a modern integrated river tow requires a good deal of rudder power. On this boat, there are two large rudders behind the propellers and four flanking rudders. The two big ones are 12½ feet long by 7½ feet high, hung on shafts about 12 inches across.

The Ashland Oil & Refining Company and the Sperry Gyroscope Company have pioneered the use of the "magnetic pilot" on river workboats. One was installed on the *Ashland* soon after she was re-engined and enlarged. This device is designed to hold the boat on a straight course so long as the pilot desires. If water suction or wind pulls a tow out of line, the magnetic pilot would bring the barges back into proper position. "You can hardly think of anything the *Ashland* needs to make its place secure in river history," declared a veteran Ohio River pilot recently. "The owners have certainly arranged for all things needed to constantly increase its efficiency." She has airflex clutches to change the direction of propeller motion without either reversing or stopping the engines. She has interlocking devices to prevent damage to the clutches through improper pilot house handling. She has cutless rubber stern tubes and strut bearings and black light for the pilot house console.

Everything needed for maintenance and repair are aboard for use while tied to shore or under way. The skin cooling system brings hot water from auxiliary engines through a channel along the outside of the hull to cool it and store it for continued circulation to the powerful engines. Kort nozzles around the propellers increases the forward thrust. It is claimed this increased the *Ashland's* thrust from 20 to 30 per cent. The pilot house has all modern devices and is blessed by wide-vision windows, six by four feet in dimensions. The pump room is one of the coolest on any river because of a cooling system which brings in fully 9000 cubic feet of fresh air per minute. An unusual paint job around the Kort nozzles and the rudders prevents corrosion and erosion. It was pointed out that the rudder paint is .02 inches thick. It was applied in eleven coats, using a special Americoat product.

There is an old idea on the rivers that to get boat power it is necessary to some extent to sacrifice boat speed, and vice versa. This has not been true of the *Ashland*. Her pushing prowess was long established and that reputation yet maintained by pushing up 15-barge tows, 975 feet long, 105 feet wide representing at capacity about 23,000 tons or 150,000 barrels of crude. Her tremendous power has made her a favorite when conditions permitted chartering one or more of the *Ashland* fleet to other companies temporarily. The *Ashland* won wide fame in all the ports from Evansville, Indiana, south when conveying thousands of automobiles for the Commercial Barge Lines. She won the plaudits of the river people for huge tows moved on the extreme upper Mississippi into St. Paul for the Northwestern Refining Co.

In many other places and stretches of navigable waterway, in times of floating ice, or when the summer heat records were being broken, in low water and in hours of flood, the *Ashland* has proven hereself one of the most dependable towboats ever built. It is a saying from New Orleans northward in prasing new boats: "She shoves like the *Ashland*"—She backs like the *Ashland*." Her owners praise the *Ashland* more for speed than for strength. They point out a March trip when she ran from Catlettsburg to Buckhorn Landing, Louisiana—a distance of 1244 miles in 96 hours. This is an average speed of 13 miles an hour. She moved back north making creditable speed too while pushing 133,000 barrels of southern crude oil.

Unquestionably the speed-and-power of diesel towboats is in this case well exemplified. Both from the standpoint of economy and that of efficiency, we see river transportation taken over by the diesel engine. A lot of sentiment lingers still for the steamer with the slowly revolving paddle wheel. It served well in its day and time. But under modern operating conditions, it simply cannot compete. As rapidly as old steam towboats are worn out, new all-steel diesel propeller vessels take their places. If the hull of the steamer is too good, the owner rarely waits. The main job at all seasons in all river shipyards is converting boats from steam to diesel.

The west coast passenger boat *Delta Queen* and the automobile carrier *Commercial Clipper* have long been rated as among the speediest craft on the rivers. Yet upon one occasion for some 18 hours, neither was able to pass the *Ashland*. The two boats behind had no barges. The *Ashland* had her full tow of empties. It was a most exhilarating event for the officers and crew of the towboat. The story was told by many river town newspapers and editorial comment explained it as typifying a complete change in our thinking about river business.

ARIZONA ARISING

Handicaps of Water Shortage to Grow Crops, Feed Live Stock and Service Burgeoning Population Overcome by Dieselizing of Agriculture, Construction and Freighting

By F. HAL HIGGINS

Harvesting lettuce for packing at the central shed in ice. The crew walks behind the cross conveyor, stooping to cut the heads that are ready for market and dropping them on the conveyor in front of them from where they are carried up and dropped into the basket trailer.

THAT copper-riveted state called Arizona has long been renowned for its sunshine that produces healthful climate, year-round crops and never-forgotten sunsets. But to the scanning eye of your old reporter, who returned to its southwest corner for a 2-day look late in January this year, Arizona is rising like a mighty giant who has been tied down for centuries. This Yuma corner of Arizona is adding nearly a million acres of irrigated farming land that will produce this year-round farming system while widening the base from which the incoming population can earn a living in eternal sunshine.

First call was on the "Big Mac's" packing house to learn about the "dry pack" method he was working out and perfecting a few years back before his death. L. M. McLaren (Big Mack) is gone, but the business he built on quality fresh vegetables products is more prosperous than ever as a result of his far-seeing mechanization ideas to beat the competition to the market top by getting his lettuce to the big consuming markets fresher to get the nod from quality buyers. President Floyd E. Newcomer proudly showed his visitors through the new office and plant that was erected last year. Then, he sent us out to the fields to see how his crews harvest dry pack lettuce under the Big Mac system. The field being harvested on the morning of January 30 belonged to Pete Pasquale, who was handling his harvest on the Big Mac system for the McLaren Produce Inc. The Big Mac dry pack system differs from one developed by Huston of Salinas in that each crate is packed on the ground by a Mexican. A crew of as many Mexicans as needed to harvest the crop as fast as weather and market demands require goes through the field of lettuce heads, cutting heads and packing in the crates dropped off ahead of them from a truck. A second Mexican with hammer and carpenter's apron with nail pockets follows to close up and nail down lids on the crated lettuce. He leaves the row of packed crates ready for loading on flatbed truck or tractor-towed trailer, depending on weather and conditions of soil.

A big D6 Cat diesel with trailer stands over at one end of field ready to help any bogged truck that fails to pull out of the field under its own power. Between such emergency jobs, the diesel tractor hauls out a load of empty crates bearing the Bic Mac brand sticker on one end. Its driver scatters them along the unharvested rows for filling by the field hands with cutting knives.

The field of green lettuce is a sight not to be forgotten in the brilliant Arizona sunlight with the sharp mountain range across the border in Mexico giving it a dramatic backdrop in an efficient quality food production scene to dramatize the mechanization pinnacle reached by this agricultural system powered by diesels. For out at the edge of the field was noted a fleet of diesel-powered refrigerated motor trucks taking on loads from the fresh dry packed lettuce as it was hauled out of the field as fast as packed. A walk over to the side of the field showed that Cummins was the brand of engine under the hoods of all these long-haul fresh food freight trucks that rush the dry packed salad material to the big consuming markets without waiting for shed packing and icing. It's the old military strategy of "getting thar fustest with the mostest" in quality! Big Mac's ideas are bearing fruit now that he has gone and his organization is carrying on with research, experience, sound

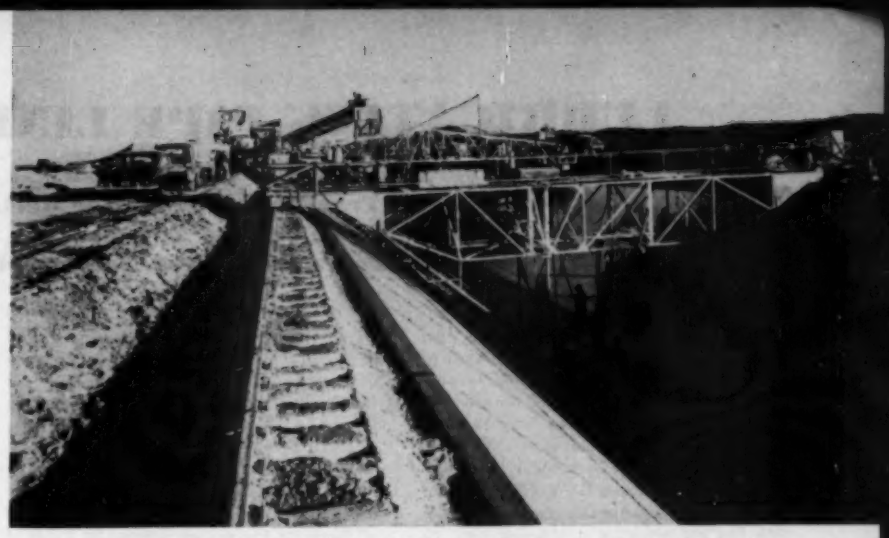
management and enough daring to keep out in front with both farming and marketing. A pure-bred herd of Aberdeen-Angus beef cattle balance the vegetable farming.

It has been twenty years since the first diesel tractors came into the Yuma and Gila valleys in this lower corner of Arizona. Ben Hulse, now a state senator in the California legislature from the Imperial Valley, just across the Colorado 25 miles to the west, started selling diesels for farming here. Since then, International, Allis-Chalmers and Oliver diesels have been coming in as tractors for doing the heavy work in increasing numbers. Also, the big Cummins-powered, long-haul freighting trucks and tankers have increased from a trickle to a stream of traffic as materials come in and vegetables and melons go out. That small patch of irrigated farming land lying south and east of Yuma has increased little by little for some years until the big projects of recent war and post-war years began doubling and multiplying the acreage watered by new irrigation developments that tap the Colorado. Now the Gila project *is* moving rapidly towards completion with one of the finest diesel-powered contracting firms in the world doing a great job.

At the urging of all contacted in the Yuma area from McLaren officials to photographer, we drove out east 25 miles on the Phoenix highway to have a look at the Morrison-Knudsen construction job. It looked more fit than when we had last seen a M-K job. Job by job and year by year, the big contractors become more dieselized as they work out the mechanization of more and more jobs and power each piece of equipment wtih diesel engines. Buda, Caterpillar, G.M., Cummins diesels were everywhere in trucks, tractors, compressors, pavers, canal bank trimmers, draglines, shovels, etc., were mobilized along the banks of the canal as it was dug, shaped and paved at a synchronized pace that was eating up the desert in record mileage. The Gila project is described by local Yuma Chamber of Commerce: "THE GILA PROJECT . . . Yuma's Future is Assured: Newest—eventually to be the largest in the state—of the federal government's reclamation and irrigation works is the Gila Project of Yuma, which when completed will add 650,000 acres to the county's cultivated area and with the Parker Project and lands now under irrigation, will bring to around 900,000 acres the area subject to crops. This vast 650,000-acre empire will extend generally eastward from Yuma on both sides of the Gila River Valley, and will include both the rich alluvial lands of that valley and the lighter mesa soils on the higher ground.

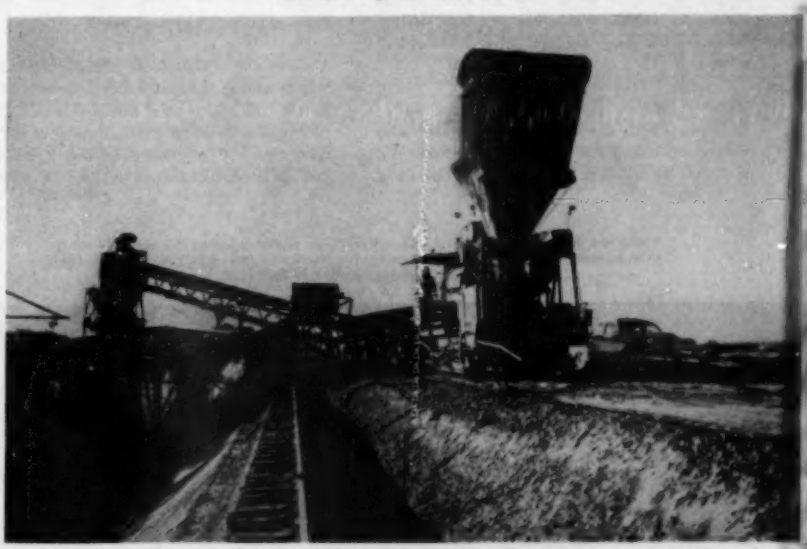
"Public lands, state and national, within the Gila Project exceed 400,000 acres. They are so situated that they can be easily and quickly provided with water from the Colorado River. The development of this resource would provide homes for thousands of farmers. This is one of the greatest opportunities in America to provide homes for War Veterans who desire irrigation farming.

"The Imperial Dam, headworks for the Gila Project and All-American Canal, is source of the Gila Project water supply."

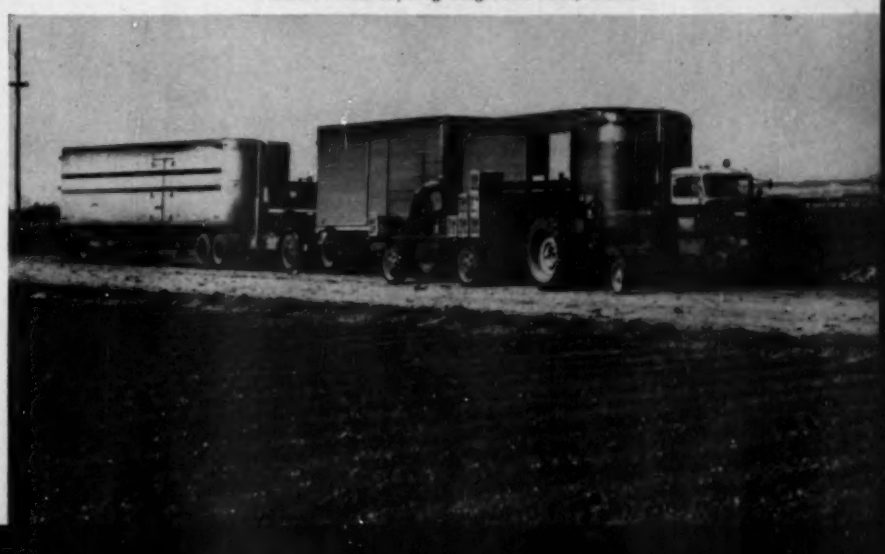


Putting the concrete lining in the canal; a Morrison-Knudson crew on the Gila river canal in southwest Arizona is using this machine only a couple hundred yards behind a similar machine that trims the canal banks and bottom ready for the concreting. It's all dieselized.

Hereunder is the concrete mixer, flipping a batch just unloaded from a diesel truck. A Buda diesel powers the big mixer.



Pair of Cummins-powered motor trucks being loaded with dry-packed lettuce for fast trip to market without any icing. Caught near Yuma, Arizona.



LUBRICATING PIPE LINE ENGINES

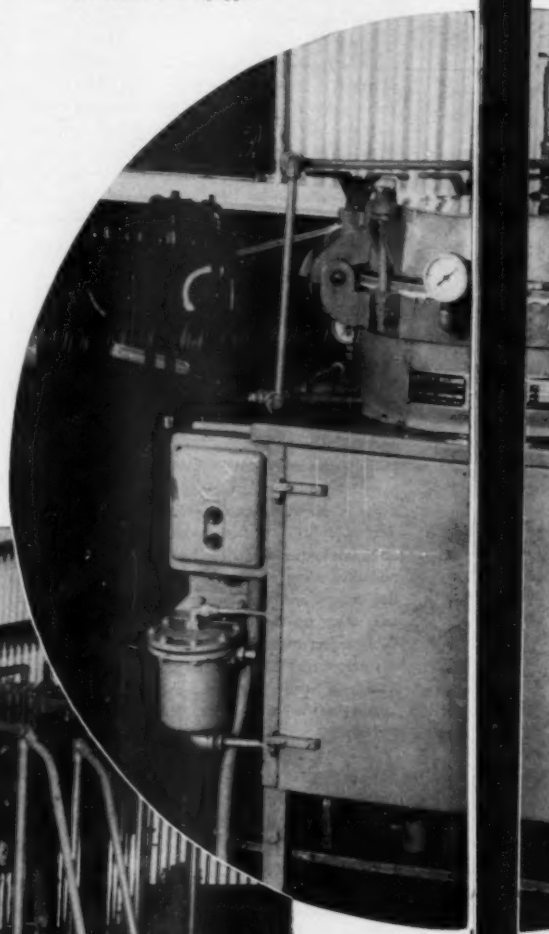
Major Oil Transporter Uses Lube Reclaimers To Keep Diesels In Service At 5 Stations; Lube Cost $58 To Pump Million Barrels Of Oil

THERE are two main objectives in lubricating pipe line engines; first, keep the units in service or available for service at all times; second, keep operating costs down. One of the major oil pipe line companies in the Southwest has used continuous purification of lubricating oil in achieving a 10-year record of operating success. This company serves oil fields in East Texas, West Texas and South Texas and operates about 600 miles of trunk line and 800 miles of gathering line. To move the oil, there are 25 main line pumping stations with power equipment ranging from 150 hp. to 800 hp. There are, in all, 25 engines, including 8 diesels—all 400-hp. Atlas-Imperials—and 17 natural gas engines, of which there are three 400-hp. Clarks, six 150-hp. Waukeshas and eight 150-hp. Budas. The other stations have motor-driven pumps.

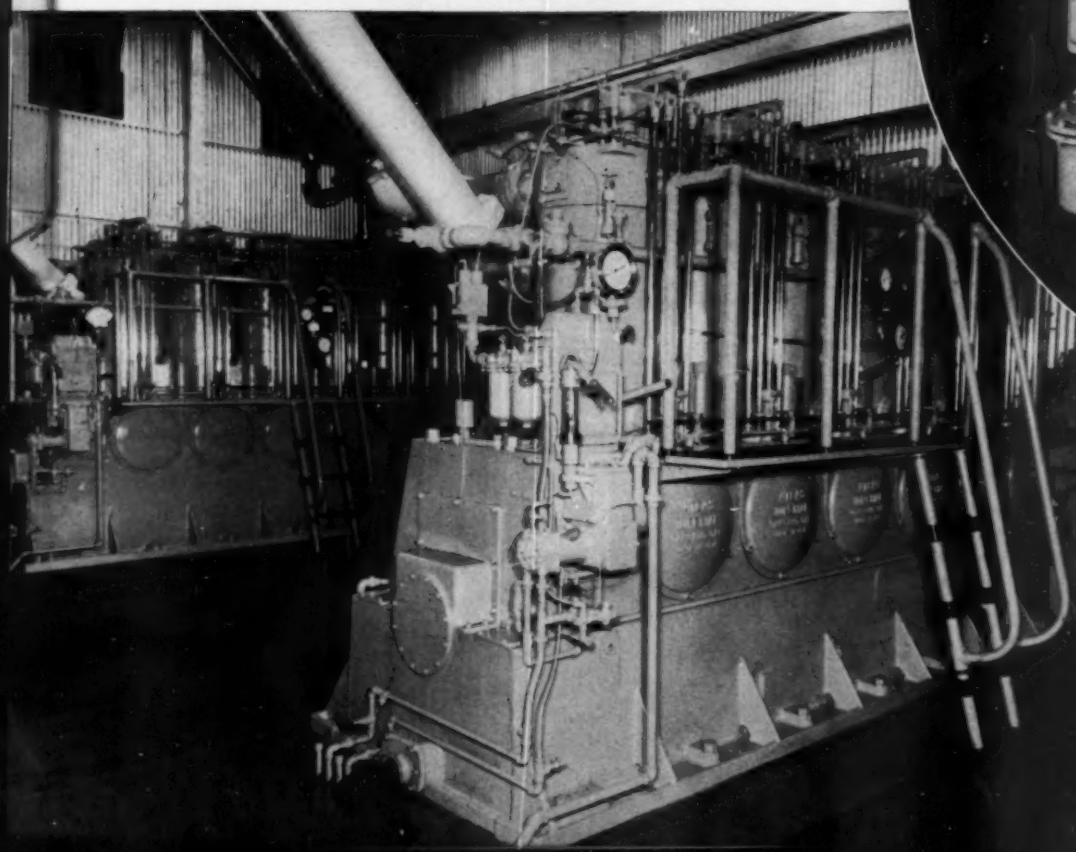
These engines completed 11 full years of service in January, 1951, and were consistantly overloaded during the War years. Overhauls were scheduled at 12,000 hours. After 70,000 hours of operation, average cylinder wear was just .022 in. More than 80 percent of the original main bearings and more than 60 percent of the original connecting rod bearings were still in service. In each 12,000 hours, the engines were down for servicing an average of 10 hours, and were available for service 99.92 percent of the time. To achieve this continuity of service, the company's engineers considered it essential to keep lubricating oil in peak condition at all times. In five stations powered by a pair of 400-hp. engines, they installed as original equipment a Hilco oil reclaimer which uses heat, vacuum, activated clay and mechanical filtration to combat dilution and contamination of the oil. In the stations using the 150-hp., higher-speed engines, Fram cellulose filters were used.

A description of equipment, methods and performance at one typical station may serve to clarify the picture. At this station, two 6-cylinder, 13"x16", 400-hp. Atlas-Imperial diesels, turning at 327 rpm., drive 4-stage 6" Ingersoll-Rand centrifugal pumps through Westinghouse gear units with a speed ratio

This Hilco oil reclaimer is in continuous operation purifying lube for two 400-hp. diesels in a pipe line pumping station. Five of the company's main-line stations are so equipped.



These two 400-hp. Atlas-Imperial diesels have been available for service virtually all the time in the 25 months since their last regular overhaul. One unit was available 100% of the time, the other 99.996%.



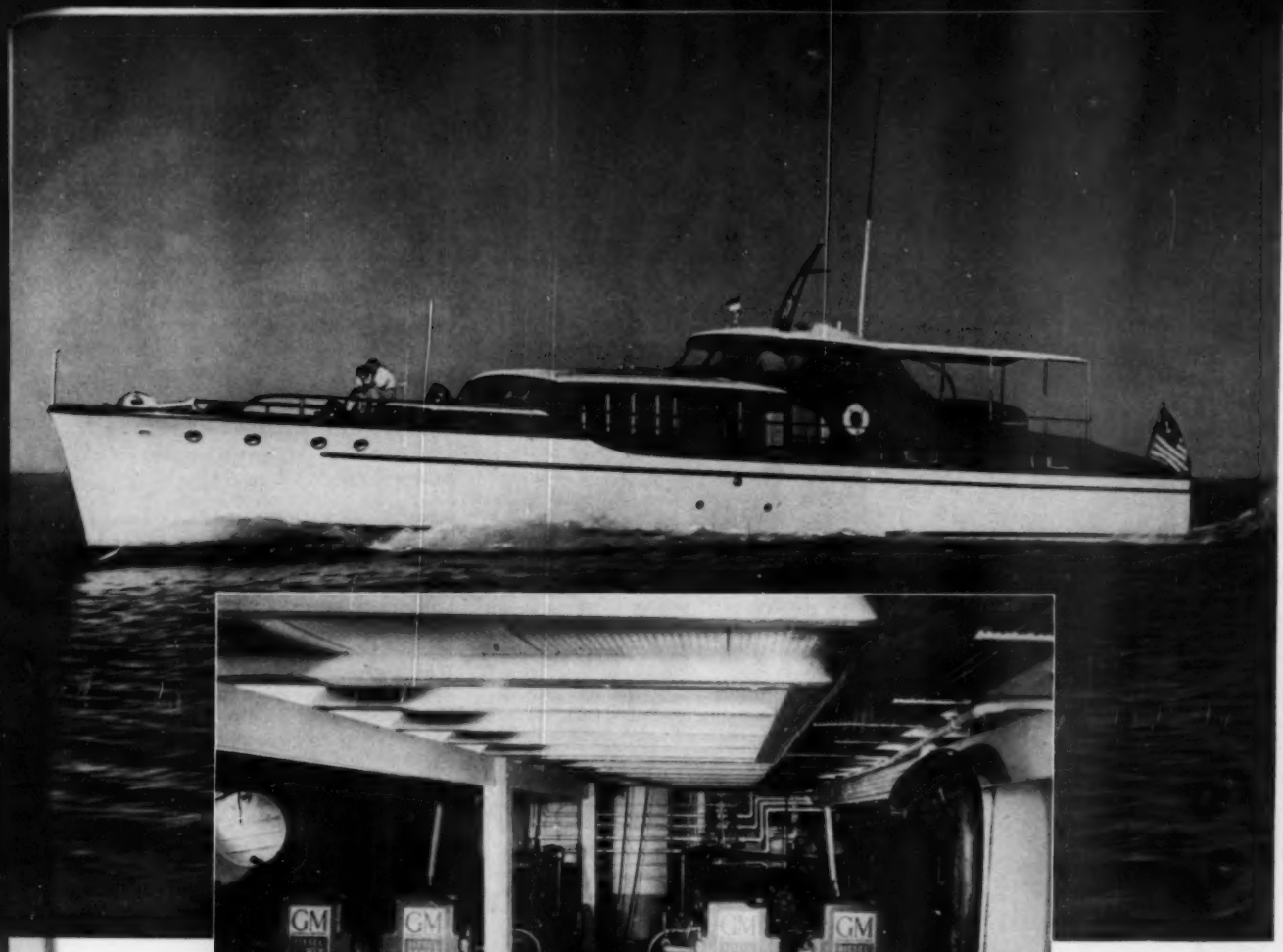
of 10.345 to 1. In practice, the two pumps are compounded, providing 8 stages. Much of the pumping is done from storage tanks and inlet pressure is just 10 lb. Oil leaves the station at 900 lb. In the year ending October 31, 1950, the two engines ran a combined total of 8,527 hours and pumped 9,954,203 barrels of oil. This required consumption of 192,832 gal. of fuel oil, or an average of just .0193 gal. per bbl. pumped. Total lubricating oil consumed during the year was 833 gal., an average of .000083 gal. per bbl. pumped. This lube consumption amounted to 4,095 hp. hr. of engine operation per gal. of lube. Figuring 6-cent fuel and 70-cent lube, the job of boosting nearly 10,000,000 bbl. of oil from 10 lb. to 900 lb. cost $11,569.92 for fuel and $583.10 for lube, an average of $0.001158 per bbl. pumped for fuel and $0.000058 for lube, a combined total of 1.2 mills per bbl. In the case of the engines which burn cheap natural gas, the fuel cost was much lower.

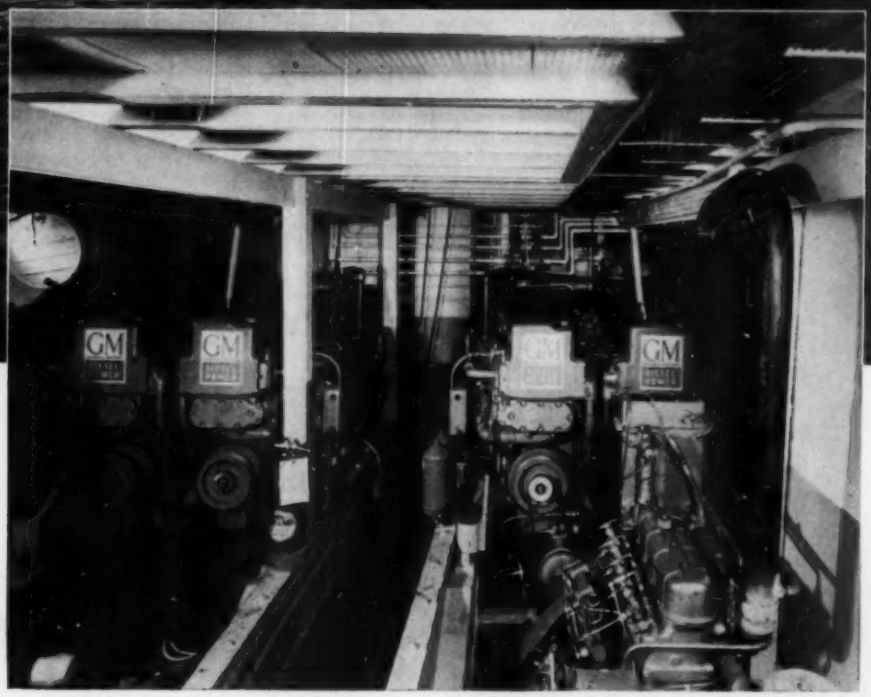
On November 1, 1950, one of the engines had run 13,240 hours since its last overhaul, the other 11,700 hours. In 25 months, the first unit had been available for operation 100 percent of the time. The second unit had been down for servicing for 40 minutes which means an availability of 99.996 percent. The lubricating oil used at this station is an SAE 40, detergent-type oil. The oil is circulated by an engine-driven pump from a sump tank to the bearings and also through a Ross oil cooler. Cylinders are supplied by Madison-Kipp force-feed mechanical lubricators. A small motor-driven pump in an adjoining building draws lube from the sump tank and puts it through a Model C-1 Hilco reclaimer, after which the oil returns to the sump. The reclaimer is in continuous operation, serving the two engines alternately.

The reclaimer is kept in operation even when the engines are not running. This is a self-sufficient station and there is always electric power available for the reclaimer and other station use. A 20 kilowatt Electric Machinery generator is belted to the No. 1 engine and sheaves are arranged so that it can be belted also to No. 2. When the plant is not pumping, power is provided by a 20-hp. Waukesha diesel-generator set. The main engines are amply protected by auxiliary equipment. Intake air is cleaned by Vortox oil-bath filters. Exhaust gases pass through Maxim silencers. A Byron-Jackson centrifugal pump belted to each engine circulates soft cooling water through the engines and through big Tulsa Boiler & Machine Co. heat exchangers. An interesting feature of this plant is the location of the exchangers on the outgoing, high-pressure oil lines. This meant a greater initial cost but has resulted in much greater savings in maintenance. In all the years the station has been in operation, it has never been necessary to clean the exchanger tubes. Samples of the cooling water are sent for laboratory analysis regularly and chemicals are added to keep pH and chromate concentration at the desired levels.

Rather than use crude oil from the lines, the company trucks in diesel fuel which is stored in two 210-bbl. tanks and is passed through a Pittsburgh meter and a Purolator filter before reaching the engines. Compared with the dollar value of product pumped, lube oil costs are negligible but it is evident from the experience of this pipe line company at five pumping stations over a period of 11 years that continuous reclamation of lube pays important dividends. With oil always in good condition, it is possible to minimize maintenance time and prevent enforced shutdowns. This type of sound operating procedure and preventive maintenance has kept the company's prime movers virtually always available for service.

This building houses two diesels which drive 4-stage centrifugal pumps. Seen here are the Maxim exhaust silencers and the Vortox air filters.





NEW DIESEL YACHT

"As a present, we'll fill up the diesel tanks the first time," said a San Francisco fuel oil dealer at the recent launching of the Stephens Brothers' 85-foot yacht, "Westlake." That was before he learned that tank capacity was 2500 gallons! Built for home-builder Henry Doelger of San Francisco, the new luxury cruiser is the largest to be built on west coast during the past 20 years, and the last to be built before priorities. Driven by two pair of twin 6-71 GM diesel motors, the yacht will travel at 19 miles per hour, and has a range of 1500 miles.

About the size of an average 5-room house, the $150,000.00 yacht sleeps 6 plus a crew of 3. In addition to three staterooms, there is a main salon with built-in bar, dining salon, galley, crew quarters, and pilothouse. Heating is supplied by a diesel-burning hot water boiler with uni-flow single line piping. Fully automatic, it is designed especially for marine installations by Way-Wolff and is similar to that installed on the Presidential Yacht Williamsburg. In addition to heating the cabins, it is also piped to the galley, lavatory, and 3 complete bathrooms on board the new Stephens ship.

HOUMA, LOUISINA

Fuel Cost at Houma 1.61 Mills Per Kwh; Three 2,000 hp. Nordberg Gas-burning Diesel Engines Cut Costs in Half in First Full Year of Operation; Gas Consumption 10.8 Cu. Ft.; Pilot Fuel 4.3%

By DOUGLAS SHEARING

THREE 2,000 hp. Nordberg gas-burning diesel engines in the Houma, Louisiana, municipal power plant, generated electric power in the fiscal year ended Sept. 30, 1950, for a total fuel cost of 1.61 mills per kilowatt-hour. This was achieved with a fuel oil price of 9.16 cents a gallon and a gas rate of 12 cents per MCF. It was possible because the efficient prime movers turned out a kilowatt-hour on 10.8 cu. ft. of gas and a meager .0034 gal. of pilot oil. The pilot oil was down to 4.3%.

Most municipal power systems expand gradually to meet the growing demand and, until 1945, Houma followed this conventional pattern. Initially, a steam plant pioneered the system and the city turned to diesels in 1922 with the installation of two 300 hp. McIntosh & Seymour air-injection engines. A 340 hp. unit of the same make was added in 1926. Ten years later, the building was extended to accommodate a 1,050 hp. Fairbanks-Morse diesel, and in 1938, a 1,080 hp. Alco-Sulzer unit was added. In 1942, the city bought another engine, but the War Production Board found higher priority need for the unit and it was never delivered.

The city pulled through the next few years with existing equipment but the growing demand necessitated an additional source of power. The only possible source was the private power company and Houma contracted to purchase power to supplement its own production. From Sept. 1, 1945, to June 30, 1949, the city bought 19,167,453 kwh. for a total of $160,145.89, an average of 8.32 mills per kwh. It should be noted that this cost would have been higher except for a credit of $46,353.42 which the utility allowed the city because it had its own plant.

Exterior view of the Houma plant showing the Maxim exhaust and intake silencers, gas inlet pipe and Nordstrom gas valves.

HOUMA, LOUISIANA MUNICIPAL POWER PLANT — TABLE ONE

	KWH Generated				Pilot Oil		B.t.u. per KWH					
1949	Total Plant	Gas Units	Gas Consumed MCF*	Gas cu.ft. per KWH	Total Gal.	per KWH	Gas	Oil	Total	% Pilot Oil	Cyl. Lube Oil	Engine Hours
Oct.	1,601,000	1,574,000	17,353	11.0	5,571	.0030	10,626	412	11,038	3.7	366	1,740
Nov.	1,218,000	1,216,000	12,928	10.6	4,097	.0033	10,240	454	10,694	4.2	279	1,300
Dec.	1,316,400	1,305,000	13,846	10.6	4,521	.0034	10,240	468	10,708	4.3	297	1,369
1950												
Jan.	1,362,400	1,122,000	11,874	10.5	4,398	.0039	10,143	536	10,679	5.0	405	1,284
Feb.	1,232,200	1,353,000	14,191	10.4	4,718	.0034	10,046	468	10,514	4.4	408	1,402
Mar.	1,345,000	1,345,000	14,389	10.6	4,812	.0035	10,240	481	10,721	4.5	444	1,420
Apr.	1,358,600	1,357,000	15,026	11.0	4,973	.0036	10,626	495	11,121	4.4	470	1,467
May	1,791,200	1,781,000	18,843	10.5	6,378	.0035	10,143	481	10,624	4.5	564	1,887
June	1,816,400	1,890,000	20,728	10.9	6,357	.0033	10,529	454	10,983	4.1	540	1,885
July	1,875,000	1,858,000	19,998	10.7	6,441	.0034	10,336	468	10,804	4.3	547	1,862
Aug.	2,135,000	2,065,000	22,688	10.9	6,837	.0032	10,529	440	10,969	4.0	547	1,966
Sept.	1,956,200	1,917,000	21,255	11.0	6,310	.0032	10,626	440	11,066	3.9	440	1,882
Total	19,009,600	18,783,000	203,099	10.8	65,213	.0034	10.433	468	10,901	4.3	5,307	19,464

*Figures for 1950 are corrected for temperature.

HOUMA, LOUISIANA MUNICIPAL POWER PLANT — TABLE TWO

Comparative Statement of Operating Expenses

For Fiscal Years Ending September 30, 1947, 1948, 1949, 1950

GENERATION	Sept. 30, '47	Sept. 30, '48	Sept. 30, '49	Sept. 30, '50
Salaries and wages	$ 15,854.92	$ 16,951.41	$ 18,695.83	$ 22,876.74
Engine fuel	50,552.88	58,537.42	35,067.50	33,298.05
Lubricants	7,143.74	6,554.72	4,871.94	5,226.25
Maintenance Equipment	18,888.58	4,148.92	1,675.48	3,098.49
Structures and Improvements	273.95	450.57	488.37	1,152.26
Purchased electricity	30,551.00	59,506.08	45,145.94	
Supplies	1,509.48	726.27	643.78	646.34
Small Tools	50.81	78.09	446.98	188.42
Calibration & chart reading			210.00	422.75
Repair parts	472.02	52.32	138.88	20.31
Compensation insurance	206.36			
Miscellaneous		9.17	330.54	447.23
Total Generation Expense	$125,503.74	$147,034.97	$107,715.24	$ 67,376.84
TRANSMISSION AND DISTRIBUTION				
Salaries & wages	$ 24,175.50	$ 10,498.02	$ 5,528.37	$ 5,668.30
Maintenance & repairs, lines, wire, hardware	30,781.87	7,763.94	4,588.74	10,523.35
Truck repairs	530.85	676.37	2,162.80	537.22
Gasoline & oil	831.41	622.90	820.01	793.66
Small tools	419.90	76.84	82.72	49.02
Supplies	124.64	183.16	100.41	54.55
Compensation insurance	336.50			
Miscellaneous	129.95	392.45	296.12	361.54
Total Transmission & Distribution	$ 57,330.62	$ 20,213.68	$ 13,579.17	$ 17,987.64
TOTALS	$182,834.36	$167,248.65	$121,294.41	$ 85,364.48

It was clear to Houma's progressive administrators that the city could generate power for considerably less than the utility charges and they decided to erect a plant addition capable of carrying not only that portion of the load supplied with purchased power but the entire system's demand. Thus, Houma could have the most modern and efficient generating equipment for power production at low cost, with the old diesels serving as standbys. Implementing this decision, Houma constructed a wing on its light and water plant and installed three Norberg gas-burning diesel engines, each of five cylinders, 21½ in. bore and 29 in. stroke, rated at 2,000 hp. at 225 rpm. These two-cycle engines burn natural gas with a small quantity of pilot fuel to initiate combustion. They can also operate as oil-burning diesels.

The three units went into full operation in June, 1949, and Houma stopped buying power. The official city financial report for the year ending Sept. 30, 1950, shows the economic effects of generating power in the new plant. Total generating costs were $67,376.84 for 19,009,600 kwh compared with $107,715.25 for the 15,671,255 kwh generated and purchased the previous year. With the gas engines in operation, the cost of labor, fuel, lube, maintenance, supplies, repair parts and small tools was 3.54 mills per kwh. Since the comparable cost of generated and purchased power the year before was 6.87 mills, the city saved 3.33 mills per kwh or $63,301.97 at the 1950 volume of production. Comparison with the cost of purchased power alone is even more striking. If all the 19,167,453 kwh purchased by the city at 8.32 mills had been generated at the 1950 cost of 3.54 mills, the saving would have been $91,620.42. The basis for the low generating cost inevitably is fuel economy. Total fuel cost for the entire plant was 1.75 mills per kwh. For the gas-burning engines, fuel cost 1.61 mills.

In the 1950 fiscal year, the three new Nordberg gas-burning engines generated 18,783,000 kwh., 98.8 per cent of the total. The engines consumed 203,099,000 cu. ft. of natural gas, an average of 10.8 cu. ft. per kwh. Pilot oil consumption was particularly low, a total of 65,213 gal. or .0034 gal. per kwh. Expressed in terms of heating value, gas provided 10,433 btu. per kwh and fuel oil 468 btu. for a total of 10,901 btu. per kwh. The pilot oil's contribution was a lean 4.3 per cent. Lubricating oil consumption also was low, a total of 5,307 gal. for the year. With the three engines running a combined total of 19,464 hours, this represented a lubricating oil consumption of one gallon per 7,335 hp. hr. Table 1 gives detailed operating figures for the year.

A new wing (at right) was added to the attractive Houma Light & Water Plant to accommodate three new 2,000 hp. Nordberg gas-burning diesel engines. The plant addition was designed by City Engineer J. C. Pittman.

Three Nordberg two-cycle, five cylinder, 21½-in. x 29-in. gas-burning diesel engines at Houma, Louisiana Municipal Power Plant. These engines are rated at 2,000 hp. each at 225 rpm.

A detergent oil is used for upper cylinder lubrication and a straight mineral oil in the crankcase. Lube is pumped continuously from the sump through a fuller's earth purifier and back to the sump. The lube system for each engine includes a shell-and-tube oil cooler and a motor-driven auxiliary pump used in starting and stopping the engine and as a standby for the lube circulating pump.

Houma is in the midst of oil and gas country and the natural gas is purchased from a local company. The gas is not processed in a dehydration plant and retains many of the light ends. LHV is 966 btu. per cu. ft. Reaching the plant at 30 psi., the gas passes through a scrubber, meter and regulator and goes to the engine compressors. There are thermometers in the gas lines to permit a temperature correction in calculating the volume of gas consumed. The engine-driven compressors raise gas pressure to 1150 lb. before injection into the cylinders. A motor-driven auxiliary gas compressor can be used if an engine-driven compressor fails. The regular fuel injection pumps serve as gas valve

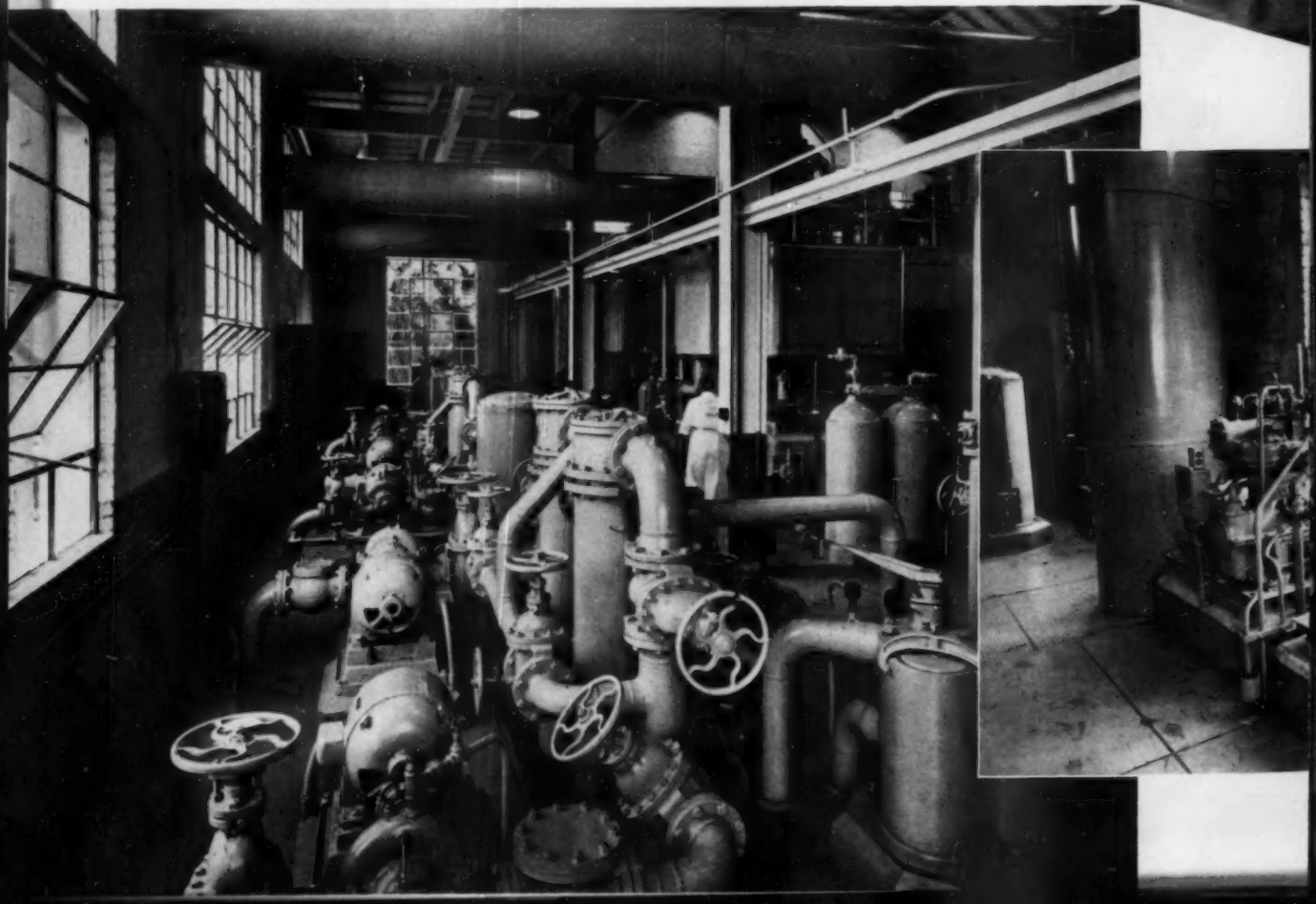
actuators when the engine runs on gas. A separate set of accurate, small-volume injection pump handles the pilot oil. The engines can be operated as full diesels but the possibility is remote in this gas-abundant location.

A pair of motor-driven centrifugal pumps for each engine circulate the cooling water. One pump sends soft water through the engine jackets and through a heat exchanger. The other pumps raw water from the nearby bayou through the exchanger and then to waste. There are headers on both the soft and raw circuits to permit use of any pump on any engine. Makeup for the jacket supply is treated in a softener. A large overhead water tank serves as protection against damage through pump failure. A gauge board near each engine holds pressure gauges, an alarm panel and an exhaust pyrometer. The new 15-panel switchboard is metal-clad and has electrically-operated switchgear. Circuit breakers can be rolled right out of the board for servicing. Instrumentation is particularly complete. There is nothing haphazard about operating at this plant. Frequency is maintained by short-wave check each shift with Station WWV in Washington and must be shown on the operator's report. The plant has its own short wave system for communication with service trucks.

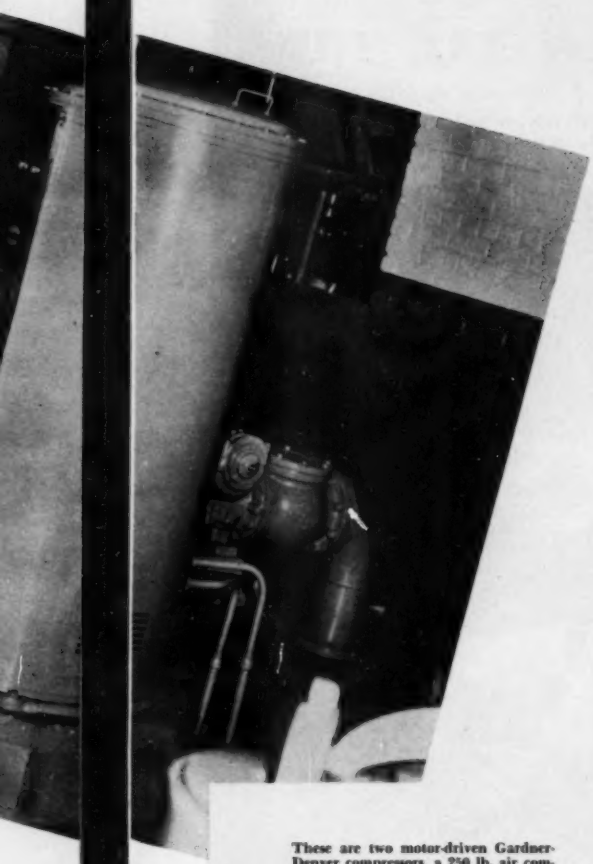
Houma spared no expense in equipping the new power plant for this was regarded as an investment in efficiency. This municipal power system has a

Honan-Crane lube oil filter, a Ross lube oil cooler and raw water heat exchanger and Nordberg lube strainer.

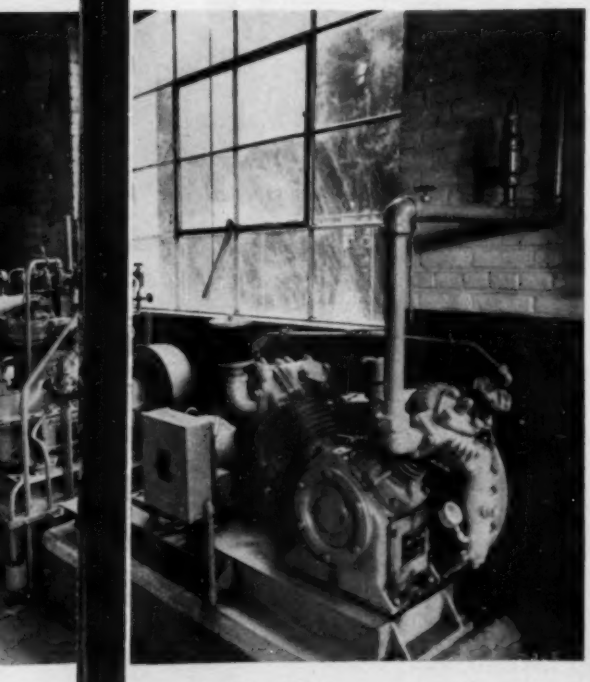
Auxiliary equipment for each engine includes a Honan-Crane lube oil purifier, a Ross oil cooler, a Nordberg lube strainer, a Blackmer auxiliary lube pump, a Ross heat exchanger and Peerless cooling water pumps.



long record of profitable operation but the new plant is paying unprecedented dividends. In the last fiscal year, after payment of all costs of production, distribution, administration, insurance, and depreciation, the electric department had a net profit of $253,308.15. This is true in spite of the fact that electric rates to consumers are among the lowest in the state. Power plant profits are important to Houma, financing both current government and long-range improvement. In the past five years the city has spent $875,000 for the new plant, $150,000 to rewire 90 per ment of the distribution system, $400,000 for a sewage gathering system, and $225,000 for a sewage disposal plant and a fire defense system. All this has been achieved without special tax levies. In the last four fiscal years, expenditures of the city general revenue fund exceeded income by $324,792.98 with the electric department making up the difference. With a profitable power plant paying the bills, taxes are low and most residents pay no local taxes at all. As an extra dividend, the plant provides the city free services valued at $46,000 a year. Houma is a thriving, expanding city of 11,000 population with its prosperity firmly based on oil, fish, fur and sugar cane. This is the shrimp center of Louisiana. The plant serves a wider area with 18,000 population and also an REA cooperative. Though the industrial and commercial consumers are important, the recent vast growth of electric load has been primarily a development of residential consumption. In the past few years, home air conditioning has become commonplace and peak power demand has shot up from 200 kw. in 1946 to more than 5000 kw. in 1950. An important factor in the development of Houma's power prosperity and the construction of its efficient new plant has been the city's administrative team with Mayor Leon Gary and Aldermen Gibson J. Austin, Sr., William J. Cenac, Jr., Paul V. Haydel, Lucas Marcello and Christian L. Olivier, Jr. Important in both the planning and successful operation of the plant is J. C. Pittman, City Engineer and Superintendent of the Light & Water Department.



These are two motor-driven Gardner-Denver compressors, a 250 lb. air compressor at right and a 1200 lb. auxiliary gas compressor at left.



HOUMA, LOUISIANA MUNICIPAL POWER PLANT — TABLE THREE

Comparative Statement of Income and Expenses

For Fiscal Years Ending September 30, 1947, 1948, 1949, 1950

	For Fiscal Year Ending			
INCOME	Sept. 30, '47	Sept. 30, '48	Sept. 30, '49	Sept. 30, '50
Sales of electricity	$295,404.49	$381,714.17	$393,876.17	$431,050.63
Services	1,025.16	2,227.95		
Penalties	2,122.88	2,565.59	2,414.41	3,045.30
Installation & transfer fees	1,367.00	1,018.00	1,164.00	1,220.50
Sales of scrap				2,498.82
Miscellaneous	1,437.32	714.68	920.58	81.64
TOTAL INCOME	$301,356.85	$388,240.39	$398,375.16	$437,896.89
EXPENSES				
Operating Expenses				
Generation	$125,503.74	$147,034.97	$107,715.24	$ 67,376.84
Transmission & distribution	57,330.62	20,213.68	13,579.17	17,987.64
Depreciation	15,865.93	15,908.30	28,299.88	47,276.93
TOTAL OPERATING EXPENSES	$198,700.29	$183,156.95	$149,594.29	$132,641.41
General & Administrative Expenses				
Salaries	$ 5,679.89	$ 5,578.21	$ 6,623.30	$ 7,614.81
Office supplies & expenses	265.69	512.86	559.75	427.61
Telephone & telegraph	144.35	280.68	449.16	487.46
Insurance, general	395.69	531.41	1,863.75	2,591.57
Insurance, engine breakdown			1,079.44	2,747.05
Compensation insurance	13.63	1,355.93	1,022.89	1,514.56
Postal cards	280.11	345.00	584.84	280.18
Automobile expenses			390.80	1,141.08
Freight & use tax on materials				993.29
Miscellaneous	248.80	303.50	14.55	54.72
TOTAL GEN. & ADMIN. EXPENSES	$ 7,028.16	$ 8,907.59	$ 12,588.48	$ 17,852.33
Discount allowed customers less discounts earned	$ 25,222.64	$ 31,424.00	$ 32,051.42	$ 34,095.00
TOTAL EXPENSES	$230,951.09	$225,488.54	$194,034.19	$184,588.74
Excess of Income over Expenses	$ 70,405.76	$164,751.85	$204,340.97	$253,308.15

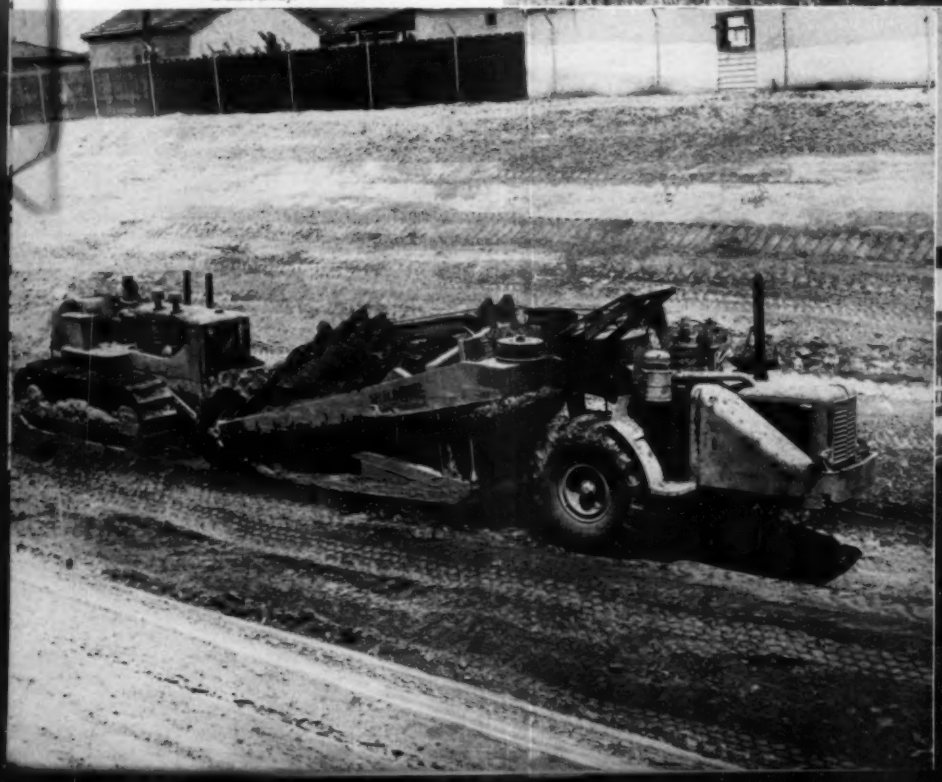
List of Equipment

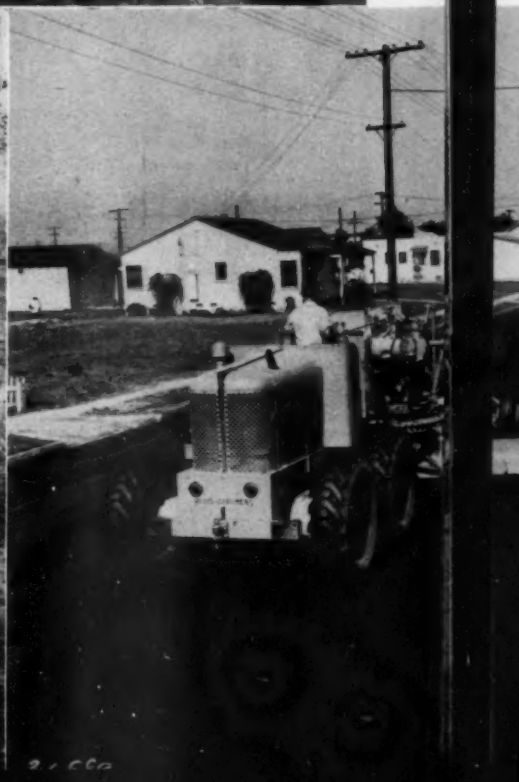
Engines—Three 2000 hp. 21½ x 29, 225 rpm. five gas-burning diesel engines. Nordberg Mfg. Co.
Alternators—Three 1763 kva., 1410 kw. 2400 volt, 3 phase, 60-cycle alternator with V-belted exciter. Elliott Co.
Gas—Sugar Bowl Gas Co.
Scrubbers—Blaw-Knox.
Gas Valves—Nordstrom.
Gas Meters—Emco.
Actuator Pumps—American Bosch Corp.
Fuel Oil—Standard Oil Co. of Louisiana.
Fuel Filter—Wm. W. Nugent & Co., Inc.
Fuel Pumps—American Bosch Corp.
Governors—Woodward Governor Co.
Lube Oil—Rotella 40 in. cylinders. Talpa 30 in crankcase. Shell Oil Co.
Lube Oil Filter—Honan-Crane Corp.
Lube Oil Cooler—Ross Heater & Mfg. Co., Inc.
Auxiliary Lube Pump—Blackmer.
Water Pumps—Peerless.
Heat Exchanger—Ross Heater & Mfg. Co., Inc.
Zeolite Softener—Illinois Water Treatment Co.
Compressors—Gardner-Denver Co.
Gauge Board—Nordberg Mfg. Co.
Pyrometer—Alnor. Illinois Testing Lab., Inc.
Alarms—Viking Instruments Inc.
Gauges—Lonergan.
Motor-control Panels—Westinghouse Electric & Mfg. Co., Inc.
Switchboard—General Electric Co.
Batteries—Exide.
Air Filters—American Air Filter Co., Inc.
Silencers—Maxim Silencer Co.

The new Allis-Chalmers HD5 with Tracto-Shovel dumping into truck on a Los Angeles job for Emmet J. Malloy, excavating contractor. Shaw Sales & Service, Allis-Chalmers industrial dealer, finds the new size diesel-powered tractor is a natural for a lot of jobs like this.

Allis-Chalmers blade grader powered by GM diesel at work on a Los Angeles county road, a job that a fleet of these graders does scattered over the rugged back country of southern California areas.

Two great diesel engines team up in this dirt moving job on the Los Angeles airport. The Allis-Chalmers has a GM engine that is doing a pusher job as the Cummins engine moves the Wooldridge carryall scraper as it picks up a heavy load of dirt to be carried and spread at the far end of the field a mile away.





THEY ALL WANT DIESELS

Shaw Sales & Service Finds GM-Powered Allis-Chalmers Tractors, Graders and Cummins-Powered Wooldridges in Big Demand by Contractors

By F. HAL HIGGINS

"GO OUT to Shaw's plant at 5100 Anaheim road and ask for Beals Shaw or Manager Stryker and you'll hear about and see all the Allis-Chalmers industrial diesel tractors and graders you will need," so replied Branch Manager Benedict when the writer checked in at Los Angeles recently and began calling his old friends and acquaintances in the industry to learn where the "digging" diesels were. But there were diesels at work changing the face of the City of the Angels right under the visitor's nose and toes, he noted as he started out the door of his hotel and saw that old Pershing Square was getting a new look with a flock Caterpillar and Allis-Chalmers crawler diesels parked where the bench warming loafers used to feed the pigeons and listen to unsoaped soapbox orators spiel their lines on religion and politics to listeners and non-listeners alike. A closed view after crossing the street and threading a way through the litter of broken paving and parked equipment revealed the famous hub of the city being transformed into a underground auto parking plant similar to the one in San Francisco in front of the St. Francis Hotel. But one look was enough for the morning after a contact was made with the contractor on the job to get engineering data and pictures later in the week.

Manager Stryker of Shaw Sales & Service Co. was on the job at the main plant out on Anaheim road when your Old Reporter arrived right after opening hour. Stryker was busier than the proverbial feline on the metal roof what with handling stacked-up telephone calls from contractors and governmental officials asking for new and/or used equipment powered by diesel engines. But between calls on phone and in person he managed to pin point the location of some of the biggest jobs not too far from the scene for visits that day. A landscaping job in which an AD4 blade grader and an HD5G were teamed on a small but ticklish job around a new building for the Carpenter Steel Co. at Boyle and Soto streets. "Mac" McGovney was on the job for Reliance Equipment Company, which conducts a 24-hour service in construction equipment rentals: cranes, dozers, graders, rollers, trucks, scoops, compressors, generators, saws, etc. With him on this job was E. M. Gibson, in charge of service, plus two operators on the GM-powered diesel equipment that was making fast and efficient progress to get the new building landscaped and ready for seeding. "It's a great pair of dirt movers," replied the Reliance men in answer to questions as to how they were working. "Look at the way that HD5 spreads that dirt as evenly as wanted and right up against the walls of the building and on into the corners. And note how easily the operator maneuvers the grader back there in the rear of the lot. Of course, as to diesels, we wouldn't buy any other kind these times when every means of cutting costs to meet red hot competition and leave a profit are essential."

From this job over to the west side of Los Angeles to see the busiest and most talked about diesel tractor in town at the site being scooped out for the University of Southern California dental building. "That's the only HD19G with that big 4-yard overhead scoop combination on the West Coast," said Mr. Shaw. To find it as it was whisked from job to job to scoop up and load the dirt removed from excavation jobs handled by R & R Construction was a job for a sleuth in construction news. It had moved in a quick jump between check-ups at Shaws on its location. But by getting up early and catching it by 9 in the morning, it was cornered on an excavation and loading job back of the famous University of Southern California, not far from downtown Los Angeles, comparatively. The big Chinese red monster called the HD19G with its 4-yard bucket held high overhead was spotted two blocks away as the visitor approached. It loomed up like a mad elephant with lifted trunk as to trumpet its defiance to the jungle it was attacking. It was in waiting position for the Shell service truck, which drove up for service as the visitor arrived with note book and camera.

With the big GM-powered diesel Allis-Chalmers tractor still for a minute or two while the Shell service man gave it attention in loading a fill-up of the diesel tank. "Just watch the big fellow scoop up the dirt and fill up that truck in two passes," said C. P. Hall of R. R. Construction as he watched a string of big war type trucks roll in, pause for two scoops from the orange giant and then roll out with loads. They needed more trucks to keep it busy, as the stop of each truck was averaging about a minute for loading. "It's the greatest tractor scoop loader we have ever seen," all agreed.

"We are low on used tractors now," explained Shaw manager Stryker as his eye swept the almost empty floor and yard of the main plant. "We have three or four old ones over at our Riverside branch," he admitted, "but one of those is a 15 year old gas M but no one wants even a good gas job if he can possibly get a diesel job in the industry. In this year of 1951, diesels are wanted and nothing less. If we could get tractors enough, we wouldn't sell anything but diesels to our customers."

"We've been here in this plant handling the Allis-Chalmers line of industrial tractors and graders with other lesser lines to fill in for seven years," explained Beal Shaw, president of the dealership in question. T. J. Shaw is vice-president, and W. B. Shaw secretary. "The speed and economy of the diesel engine powering this Allis-Chalmers line has put it over and established it in contracting and constructing work in this busy growing Los Angeles area," explained Mr. Shaw. "We now have branch stores at Riverside and San Diego for more efficient coverage of those busy areas that are also growing. On all these big freeway construction jobs, dams, etc., we have put many of these tractors in all sizes. Also the Cummins-powered Wooldridges. The new HD20, which used to be the HD19 before being re-designed and improved recently is a popular number that is going out as fast as we can get them. Go out and see these jobs over the area.

One of the City of Los Angeles Allis-Chalmers diesels doing a smooth job of putting on the blacktop while a second one of the same kind is seen far in the background. Engines are GM.

Wooldridge Cummins powered scrapers parked in front of Shaw's main plant in Los Angeles.

Tuna Clipper "Saratoga"

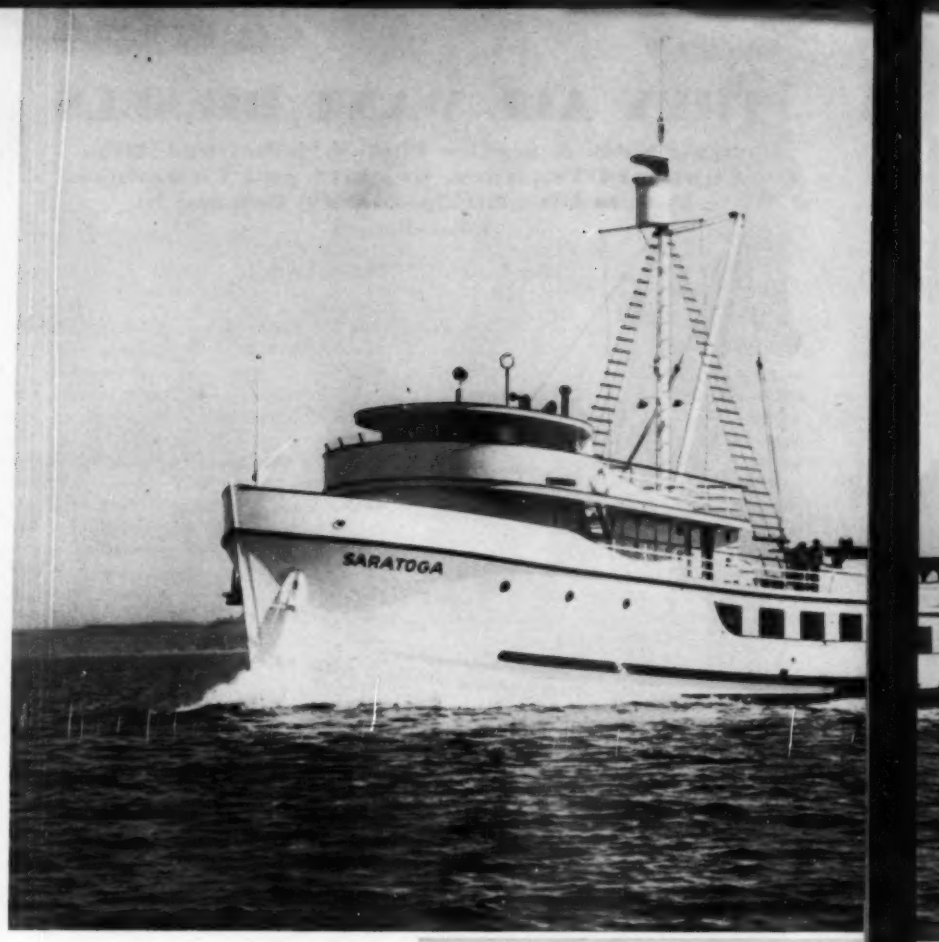
By CHAS. F. A. MANN

JOINING the Southern Pacific tuna fleet, which operates principally out of San Diego, is the new diesel wood tuna clipper, *Saratoga*, completed for a San Diego syndicate, headed by Eddie Madruga and Manuel Luz. The new vessel completed her trials late in April and headed South from the builders, Tacoma Boatbuilding Co. Inc., at Tacoma, home of over 50 of the largest clippers in the business.

Saratoga is a middle-size clipper with principal dimensions of 120 ft. 6 in. x 27 ft. 11 in. x 14 ft. 1 in. depth, packing 275 tons of frozen fish in eight main tanks and 3 deck boxes. The usual combination usage of tank system on board clippers permits 32,000 gallons of fuel capacity outbound, with the two inner tanks converted back to frozen fish capacity, as well as the 3 deck bait boxes. Main propulsion is an 8 cylinder 800 hp. supercharged Enterprise diesel, with pilot house controls. Auxiliary power is supplied by twin 100 kw. General Motors model 6-110 diesels, supplied by Evans Engine Co. of Seattle, and a smaller 6-71 GM diesel set. The larger sets each have 100 kw. Westinghouse generators while the smaller set pulls a 60 kw. generator.

The lower hull arrangement, besides the long shaft alley-pump gallery-pipe way combination in the center, packs lube oil storage for 1870 gallons and 2,800 gallons of fresh water, beside the forward pair of fuel tanks. Fairbanks Morse bait pumps with General Electric motors and Jacuzzi brine pumps with G.E. motors are featured. The large refrigeration plant consists of three 6½ x 6½ Howe compressors and a small Howe 3 x 3 inch Galley box compressor. Quarters for a crew of 14 are carried on the upper deckhouse, while the pilot house and chart room atop provide plenty of sea-view to pursue the elusive Tuna. The large galley features a heavy duty electric range, tile sink, intercom speaker radio outlets, walk-in ice box with frozen food compartment.

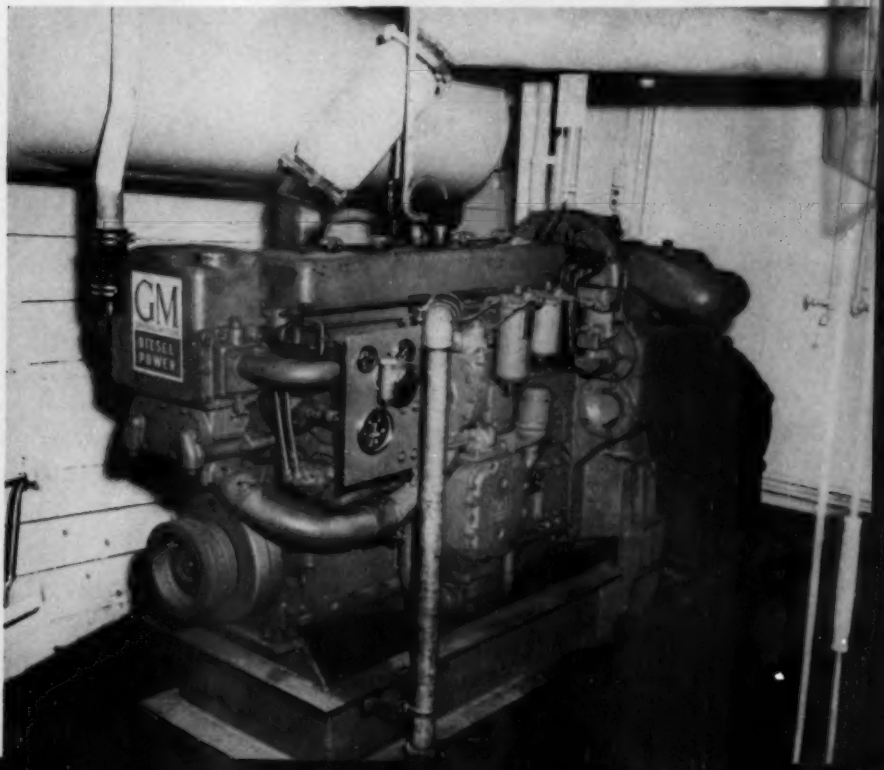
Other items of equipment are Northern cargo hoist and Northern anchor winch, each driven by Master Motors; a Photoelectric pilot; large switchboard built by Tacoma Boatbuilding Co., and elaborate navigation equipment featuring a Fathometer (Raytheon); Intervox direction finder; world-range radiophone; Flexiphone intercom etc. The 74 x 38 in. bronze propeller is by Coolidge Propeller Co., and is turned by a 6 inch Monel tailshaft. Goodrich cutless rubber stern bearing is used.



Left to right, Mr. and Mrs. Manuel Silva; Mr. and Mrs. Frank Chase; Haldor Dahl; Arne Strom; Capt. and Mrs. Manuel Luz; Tacoma Mayor John Anderson; William La Pore.

The main power plant on the tuna clipper *Saratoga* is an 800-hp. Enterprise, an 8-cylinder super-charged unit.

100 kw. General Motors diesel generating set on the *Saratoga*, one of two identical generating sets aboard.



DIESELS FOR DEFENSE

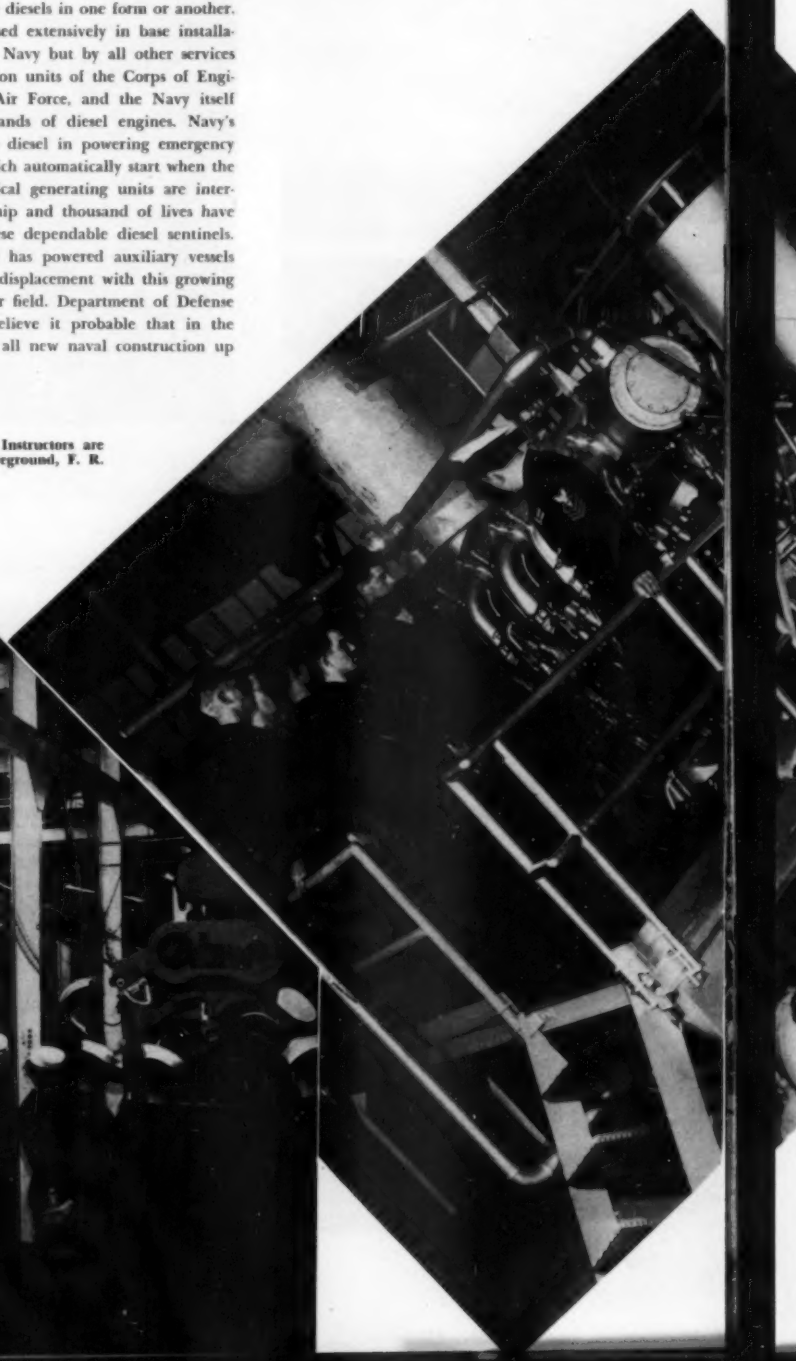
By RICHARD LaCOSTE

DIESEL dependability long has been recognized by the Department of Defense. The Navy, especially, is concerned with reliability in powering its vessels. In fact, reliability is the primary requirement imposed by its officials when ordering SEA power. Far sighted naval executives with vision and faith in the future of diesels now more than ever are contemplating the ever increasing use of diesels throughout the world. Although they realize that diesel skills are increasing in the farm machinery, construction, equipment, railroads, trucks and ships fields, they know there is even now a shortage of diesel skills in civilian life. In the service, that shortage is even more acute.

In addition to the reliability requirement, the Navy must have a minimum weight per developed horsepower and economy in action operation. In engineering plants of under 8,000 horsepower, both the two-cycle and the four-cycle supercharged diesel engines meet these requirements. In December 1941, the Navy had less than 250,000 diesel horsepower in naval installations. Three-quarters of this power was used in submarines. But when Department of Defense expansion plans materialized just prior to and during World War II, 90 per cent of the ships that slipped down the steelways were dieselized. Some 60,000,000 diesel horsepower have since been placed in the bulging bellies of U. S. Navy ships. Less than one-twentieth of this power went into submarines.

All naval ships use diesels in one form or another. Diesels also are used extensively in base installations not only by Navy but by all other services as well. Construction units of the Corps of Engineers, the U. S. Air Force, and the Navy itself account for thousands of diesel engines. Navy's combat vessels use diesel in powering emergency generating sets which automatically start when the ship's main electrical generating units are interrupted. Many a ship and thousand of lives have been saved by these dependable diesel sentinels. The Navy already has powered auxiliary vessels up to 18,000 tons displacement with this growing giant in the power field. Department of Defense diesel engineers believe it probable that in the foreseeable future all new naval construction up

General Motors 16-278A class in laboratory for emphasizing of previous classroom lecture. Instructor C. F. Jones.



General Motors 12-567 and American Locomotive classes in laboratory. Instructors are H. F. Flood and L. Gawlinski, General Motors 12-567 cutaway, right foreground, F. R. Gagne, instructor.

to the size of destroyers will be powered by diesels. Such an ambitious program calls for trained diesel skills and personnel in ever increasing numbers. Certainly, in the Navy, as elsewhere, there is a shortage of such skills and personnel. How, then, does the Navy meet this shortage? Men who man the Navy's diesels are trained at the U. S. Naval School Enginemen, Class C. Established in May '49 at the U. S. Naval Training Center, Great Lakes, Illinois, the school conducts courses of instruction under actual conditions on specific models of large, propulsion-type diesel engines and allied equipment. The course is designed to meet the needs of personnel who eventually qualify for duty afloat on the Navy's diesel-driven ships. The school is part of the Service School Command, Great Lakes, Illinois. It is under the military control of the Commander, Naval Training Center, Great Lakes. Management control remains with the Bureau of Naval Personnel in Washington, D. C.

Quotas for the school are scheduled consistent with fleet requirements and physical limitations of the school. Each subject is thoroughly covered. Unlike many service schools, students are not "rushed" through in order to make room for an incoming class. Thoroughness of instruction is the theme of the school. Courses of instruction on each engine lasts five weeks. Currently, the Navy requires that training on large, propulsion-type diesel engines be conducted with four classes taking instructions. These classes, one each on four different engines, are in session at all times. Classes comprise from five to twelve trainees for any one engine. Diesel engine courses opened to eligibles are: General Motors 8-268A; General Motors 12-567A; General Motors 16-278A; Cooper Bessemer GSB8; American Locomotive Model 539; and Fairbanks-Morse 38D8⅛ OP.

Diesel engineers today laud the progress made by the military since World War II—especially Navy. Curriculum coverage, for instance, ranges from a short review of diesel fundamentals on through physics, engine construction, engine accessories, systems, timing, gear trains, instruments, operating requirements, progressive maintenance, piston and connecting rod assemblies, cylinder units, fuel injection equipment, governing equipment and trouble shooting. The course is neither dulled by over-instruction nor pegged at too fast a pace. Sixty per cent of 150 hours contact instruction are spent in performing actual work on the engines and their accessories in the laboratory. The other 40 per cent is spent at lectures, technical motion pictures and in actual demonstration work. In keeping with modern teaching methods, much use is made of sectionalized equipment. This enables a student to become visually familiar with the inter-relationship of internal parts even before he sees a lab. Cutaways also are extensively used. One of the finest pieces of sectionalized equipment of which the school is quite proud is a complete General Motors Model 12-567A engine. It is so sectioned that every internal working part is visible as it is being driven by an electrical turning motor. Examination of the entire cycle while in motion gives students a clearcut picture of all the engine's component parts.

Plans for expansion of the school already are under way. Navy, not unlike its sister services, will have need of thousands of diesel-trained people in the near future. Those with a flair for this work are assured that all phases of diesel engines are covered since the combined experience of the school staff is some 300 years. What's more important, personnel receiving these diesel instructions are assured that whether they stay in the service or return to civilian life their diesel skills always will be in great demand.

Fairbanks-Morse class in laboratory discussing engine construction. Instructor, L. Gawlinski.

DIESEL SHIP "CELESTE"

By DAVID I. DAY

THE motor vessel *Celeste* is rapidly bringing to a close her first decade of service on the Ohio and Mississippi Rivers. Always in the southern oil trades, she has performed creditably and at all seasons with profit to her owners. The boat is now the property of the Southern States Barge Line, Inc., St. Louis, of which C. C. Rockenback is president. The boat was named in honor of Mrs. Rockenback, who christened it on May 23, 1942. As the saying goes around the yards of the St. Louis Shipbuilding & Steel Co., St. Louis: "That was the rivers' lucky day." The vessel is 124 x 30 x 9 feet in dimensions, of all steel construction, powered by twin Cooper-Bessemers, rated at 810 hp. each at 450 rpm. After more than nine years at hard work pushing oil and gasoline up the rivers, these engines still respond to every demand, are smooth-running, always with the bit of extra thrust at times needed. Incidentally, the Fairbanks-Morse electric auxiliary generating equipment has been at all times a source of satisfaction.

In a letter from a man long associated with the operation of the *"Celeste,"* we recently read: "No more dependable boat was ever engaged in the river oil trade. I've witnessed her work in the depth of winter and in the most torrid weeks of summer. The boat never disappointed. Back of her tow of six heavily loaded barges she started off with an air of confidence and as the miles lengthened she seemed ever to warm up to her task. You could collect a book of stories on the work of the boat. None is more popular with the masters and chief engineers. I regard that as the clinching argument. Yes, sir; the *"Celeste"* is more than a good one. She's a great one." This statement reminds us that the maiden trip of the *"Celeste"* had Capt. Berchman Chotin as master with Louis Buchanan as chief engineer. The boat proceeded from the St. Louis Shipyards to Norco, La., where she picked up an oil tow for Cincinnati. All the way up the tow attracted attention and newspaper notices. The present master is Capt. James E. Grover, with H. E. Robinett as chief engineer. The boat at the present time is on a shorter run, regularly towing gasoline from Helena, Ark., to Louisville, Ky., and to Cincinnati, Ohio. A week or so ago, the boat and barges passed through the locks at Newburgh,

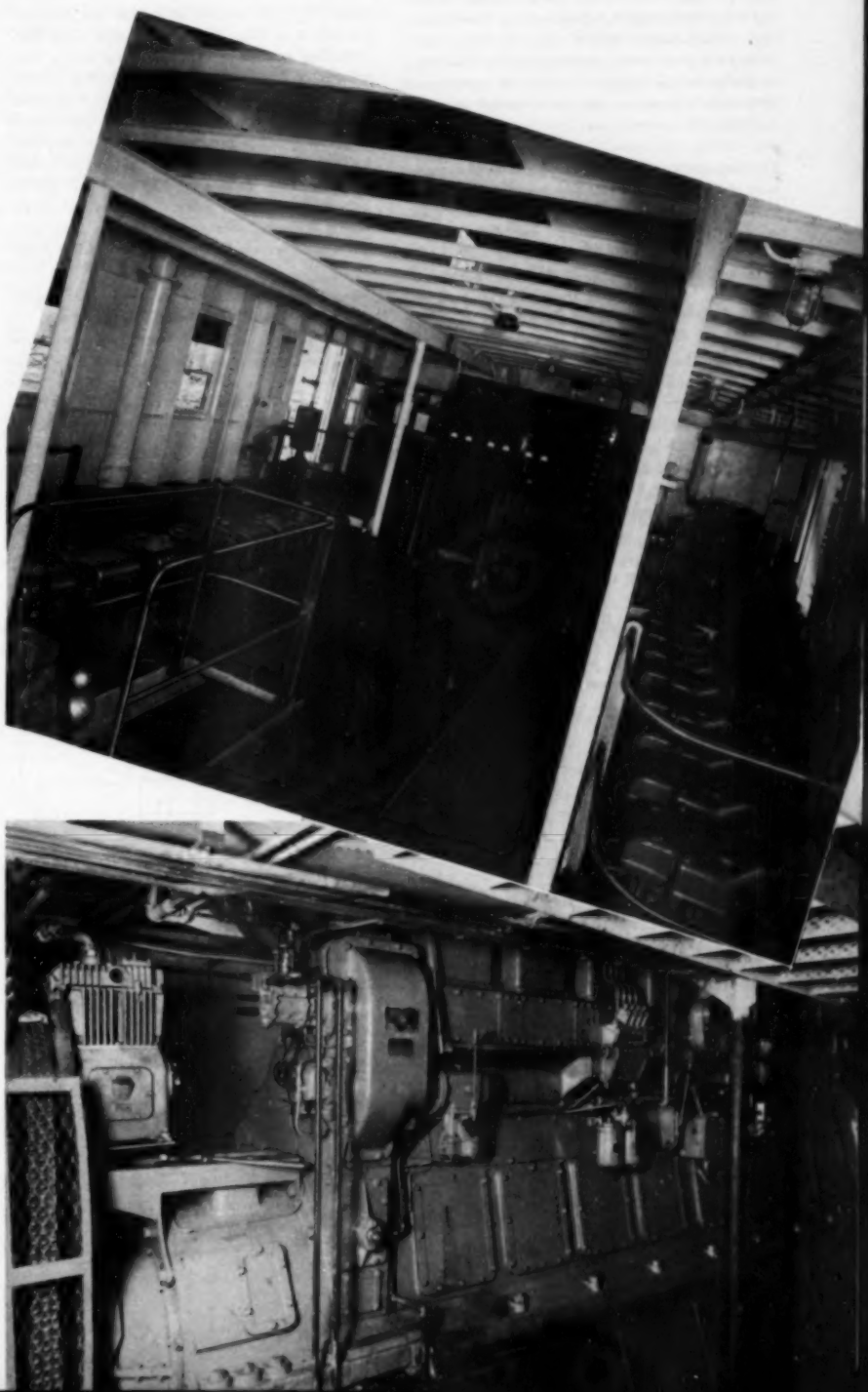
Ind., passing up the Ohio in the bright light of one of the loveliest late spring days in many moons. An old riverman noting tourists taking pictures from a river bluff commented:: "They don't realize it but they are betting pictures of one of the greatest towboats of her inches we have had on the rivers since Robert Fulton."

When the *"Celeste"* was built, the streamlined design caused more comment than it would today. We have seen the streamlining carried even further since 1942. The engine room caused even more comment and discussion among rivermen. The engines are near the aft end instead of being more nearly in the center of the hull. The result is, as demonstrated over the years, that the shorter propeller shafts have caused much less vibration. With the engines aft and the crew quarters forward, there is not so much disturbance caused by the machinery. We might add that the built-in system of fresh water cooling of the main engines, the system integral with the hull was not so familiar to river folk as it is today. Well, something has made the *"Celeste"* a most useful, a most successful, and most popular boat, year after year. Never a month goes by without some additional facts volunteered to prove that this medium-sized pusher has won a big place for herself in all the ports along the yellow rivers.

In addition to the Cooper-Bessemer diesel engines and the Fairbanks-Morse generator set, there are also two generators driven by the main engines used with Exide batteries. The electric power is controlled by a Wurdach switchboard. The air compressors are Quincy. There is also an auxiliary electric-driven Garden-Denver compressor. Morrison Bros., Dubuque, Iowa, furnished the battery of air tanks. The fire pump is from Gardner-Denver also. The bilge and ballast pumps came from Smith-Meeker, New York City. The sanitary water pumps in the engine room, a variety of electric motors and several other generators came from the Fairbanks-Morse Company. Installed also were Honan-Crane oil purifiers and oil filters. The silencers were from Maxim, the cutless bearings from Lucian Q. Moffitt, Inc., Akron, Ohio, and the searchlights from Carlisle & Finch, Cincinnati. On the *"Celeste"* are airhorns from Kahlenberg Bros. Co., motor control equipment from Cutler-Hammer, Milwaukee; hydraulic controls from Sperry Products, Inc., and the electric radiotelephone came from Warner-Tamble, Memphis. To al lthese firms and any others who may have contributed from their skill and "know-how" to the building of this boat, must go a proportionate share of the honor.

Whatever doubt existed when the *"Celeste"* was launched that this was the Diesel Age on the waterways, has since been completely dispelled. The efficiency and economy of this boat and those of her type which followed her into service, are directly responsible for the conversions of scores of steamers to diesel power. That this trend will not merely continue but will increase in intensity and scope is a certainty that pays tribute to the performance of these more modern vessels in the last ten years. Every day and every hour of every day, they have demonstrated their superiority in every way as they must continue to do in the days to come.

Two views of the engine room of the Diesel Ship Celeste showing partial views of the two Cooper-Bessemers, model J5-8 eight cylinder diesels rated at 810 hp. at 450 rpm. This successful river tow boat was put into service in 1942 and is now entering its tenth successful year of operation.



CONVERSION OF GREAT LAKES

By WILBUR W. YOUNG

CONVERSION of the twin vessels *Eugene W. Pargny* and *Homer D. Williams*, standard Great Lakes 600 ft. ore carriers was recently completed at the Lorain, Ohio yard of the American Shipbuilding Company. Both vessels were originally propelled by 200 hp. reciprocating triple-expansion steam engine fed with steam from hand-fired, coal-burning "Scotch" type boilers. The *Pargny* was converted to geared-diesel, the *Williams* to geared-turbine propulsion both to operate at 3000 shaft horsepower, and there started an engineering and economic race.

Entering service early in the 1951 season of navigation these two ships will be closely watched because the future conversion of a mighty fleet may be determined on the records they turn in this year. Having cast our lot on the diesel side many years ago, we naturally sit in the diesel bleachers. Right now, however, it is anybody's race and we say, may the beter, all around machinery win.

Pittsburgh Steamship Company, operating some sixty large bulk freighters on the Great Lakes, conducted exhaustive studies of the engineering and economics involved, before ordering these two conversions. Some results of these studies were presented in Milwaukee last Fall, before the Great Lakes Section of The Society of Naval Architects and Marine Engineers. That report is the basis of this article.

Leading up to these conversions a review of the shipping situation on the Great Lakes provided essential background. It was found that the average net tonnage of all commodities carred on these waters in three five-year periods beginning in 1932 and including the last war period was:

1932-1936	92,482,000 tons
1937-1941	155,588,000 tons
1942-1946	203,653,000 tons

During these fifteen years, while traffic increased about 83%, the number of vessels was increased by only 8 to 10%. The Great Lakes cargo fleet, excluding tankships, barges and car-ferries, now consists of 536 American and Canadian vessels, 502 of which are propelled by reciprocating steam engines and Scotch type boilers. In other words about 94% of the present cargo fleet is propelled by outmoded machinery. Only thirty-four vessels of the fleet are under twenty years of age. Of the balance of the fleet, more than one-third of the vessels are over twenty and less than forty years old while over one half are over forty years of age.

Most of these vessels will sooner or later require extensive rehabilitation and, or conversion. In fact some work has already been done along these lines, consisting mainly of replacing Scotch-type boilers with coal-burning, stoker-fired water-tube boilers. In some cases superheat has been provided, requiring refitting of main engines or new engines. The main object however, in making major expenditures on these vessels is to increase their speed and thereby materially to add to their seasonal carrying capacity and so far improvement of this nature has been only nominal. Early this year over 18 new vessels were building, aggregating about 400,000 DWTons.

Repowering of the *Pargny* and *Williams*, however, is expected to add 110,000 long tons to the seasonal ore carrying capacity of these two vessels. In further support of the conversions it is pointed out that Lake vessels were built in the early nineteen-twenties at a cost of about $100.00 per deadweight ton. Early in 1940 building costs had risen to $120.00 and later to $150.00 per ton. The latest Lakes cargo vessel built is said to have cost about $250.00 per ton. It is seen therefore that the expense of increasing the carrying capacity of the Lakes fleet by new construction is large and that conversion and modernization of machinery in existing ships offers a logical means of expanding the fleet capacity to meet rapidly increasing transport demands.

Here, for example is the estimated result of the geared-diesel conversion in cargo revenue as compared with that of the steam vessel before conversion:

Original Steamship—	*Diesel Ship*—
1800 S.H.P.	3000 S.H.P.
34.1 voyages	38 voyages
13,500 Tons of Cargo @ $1.25 per ton (1950 rates)	13,500 Tons of Cargo* @ $1.25 per ton
460,350 Tons per season	513,000 Tons per season
$575,437 Revenue per season.	$641,250 Revenue per season.

*The diesel ship will carry about 50 tons per trip more than the original vessel. This was not pointed out in the report from which these figures were taken.

Interesting also is the comparison of per diem costs:

	2000 S.H.P. *Steamship*	3000 S.H.P. *Diesel Ship*
Fuel	$421.46	$313.00
Provisions	80.00	68.00
Wages	517.00	472.00
Insurance	144.75	200.00
Repairs & Maintenance	170.86	197.17
Tug Service	43.38	43.38
Lubricants	7.57	21.60
Engineers' Supplies	7.94	7.94
Laundry & Miscellaneous	88.40	87.70
	$1,481.36	$1,411.69
Depreciation	70.92	246.50
	$1,552.28	$1,658.19

It is seen that operating costs of the diesel ship before fixed charges compare favorably with those of the original steamship. If the book value of the latter is taken at $324,000 and the geared-diesel conversion is assumed to cost $800,000, then the value of the ship after conversion becomes $1,124,000. From the above figures the comparative net earnings are estimated as follows:

Steamship 34.1 voyages @ 6.7 days = 228.5 days @ $1,552.28 per day or $354,696 seasonal operating costs. $575,437 seasonal earnings before conversion. $354,696 seasonal operating costs. $220,741 net earnings before taxes.

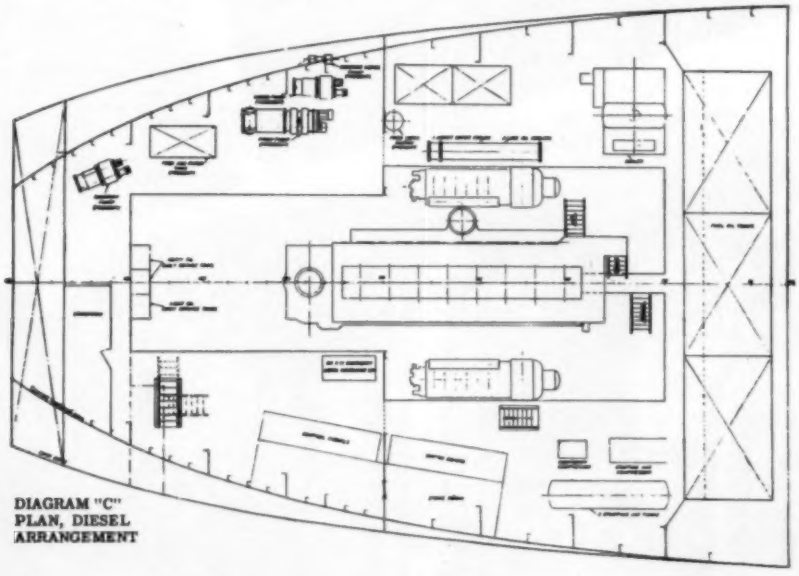


DIAGRAM "C"
PLAN, DIESEL
ARRANGEMENT

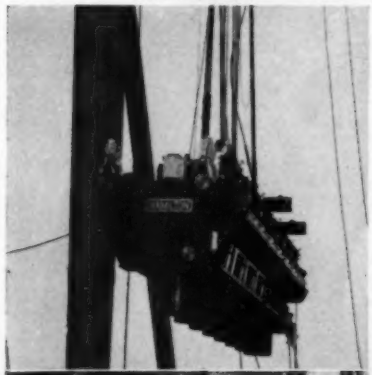
ORE CARRIERS

Diesel Ship—3000 S.H.P. For Average Service—38 voyages @ 6 days = 228 days @ $1,658.19 per day or $378,067 seasonal operating costs after conversion. $641,250 seasonal earnings after conversion. $378,067 seasonal operating costs. $263,183 net earnings after conversion but before taxes.

It should be born in mind that these investigations were made before conversion and were based on the best available information then, and that operating costs have since increased. In summarizing the advantages of the diesel conversion the following observation is made: "Another not unimportant consideration regarding the diesel conversion is that at a nominal extra cost the vessel may be fitted to operate in salt water. While this is not important to Great Lakes operators at present, it might be an element of great moment within the life of many Lakes vessels now in service. Reference is made to ore deposits in Labrador and opening of the St. Lawrence Seaway.

"If these facilities were in use now, the 500 odd unimproved ships mentioned above could not be employed without major changes to hulls and machinery. Ship operators on the Lakes are standing on the threshold of a new transportation era. Oil will flow by pipelines from Canadian fields to the Lakes. Larger volumes of foreign commerce may move into the Lakes via the St. Lawrence Seaway. A time will come . . . . when these waters will no longer be a tight enclave of jet-condensing triple-expansion steam engines and hand-fired Scotch boilers in a marine world of oil fuel steam turbines and diesel engines. Already under construction in Sweden are large diesel ships designed expressly for Lakes trade via the projected St. Lawrence Seaway to northern European ports, American operators should be ready to take their places in this new era."

"Lowering the cylinder block of a 3570-hp. Hamilton diesel into the engine room of the *Eugene W. Pargny*, 600-ft. ore carrier of Pittsburgh Steamship Company at the Lorain, Ohio, shipyard of American Ship Building Company. The slow-speed, 21½ by 27½, 2-cycle engine was manufactured by Baldwin-Lima-Hamilton Corporation, Hamilton, Ohio."



The engine chosen for conversion of the propulsion machinery in the *Eugen W. Pargny* is a Hamilton, (Baldwin-Lima-Hamilton Corporation) two stroke cycle, 8 cylinder, 21½ in. bore, 27½ in. stroke single acting, direct reversible, marine diesel of the following characteristics:

	Normal Rated	*Max. Continuous*
Brake Horsepower	3750	3930
Rotative Speed, RPM	252	260
Brake, Mean Effective Pressure, psi	70.4	75.0
Average Piston Speed ft. per min.	1155	1191
Fuel Oil Consumption, based on 19,350 BTU/lb. HHV. lbs. per Brake Horsepower Hour	.375	.375
Lbs. per Shaft Horsepower Hour	.383	.383

The above fuel oil consumptions are based on reduction gear efficiency of 98.0%. The gear set is a single pinion, 260/114 rpm. Farrel-Birmingham unit connected to the main engine through a flexible coupling.

Scavenging air is supplied to the engine by two Roots-Connersville positive displacement blowers of 3.25 psig discharge pressure, gear driven from the engine crankshaft through an hydraulic coupling. The engine is fitted with Maxim intake and exhaust silencers and an Alnor exhaust pyrometer. A Viking alarm system, audible and visual, is provided to operate on low pressure and/or high temperature of lube oil and jacket water respectively.

The Hamilton scavenging system brings air into the cylinders through ports below the exhaust ports. Both scavenging and exhaust ports are located on the same side of the cylinder. Scavenging air is forced against the opposite side of the cylinder and is deflected to the end of the cylinder and returned to the exhaust ports, thus making a complete loop through the cylinder. In order to insure that the entire section of the cylinder is scavenged the angles for the inlet ports as well as for the exhaust are accurately made.

Rotary exhaust valves are provided at each cylinder for the purpose of trapping air which would otherwise escape through the open exhaust ports. The rotary exhaust valves are located close to the cylinders, in the passage between the cylinders and exhaust manifold and are driven from the crankshaft. The valves for each cylinder are interchangeable, and consist of cranks with curved hoods. They are timed so that the edge of the hood closes the exhaust passage when the engine piston closes the scavenging ports. The valve cranks are supported between each cylinder, in ball bearings.

The benefits of full diesel conversion will not be realized in this case because it was economically necessary to retain various steam equipment such as deck machinery and auxiliaries. This conversion of the propulsion machinery is however, based on sound reasoning and it portends many more similar conversions of Great Lakes vessels. The *Eugene W. Pargny* will be the object of consuming interest as she plys the Lakes this summer.

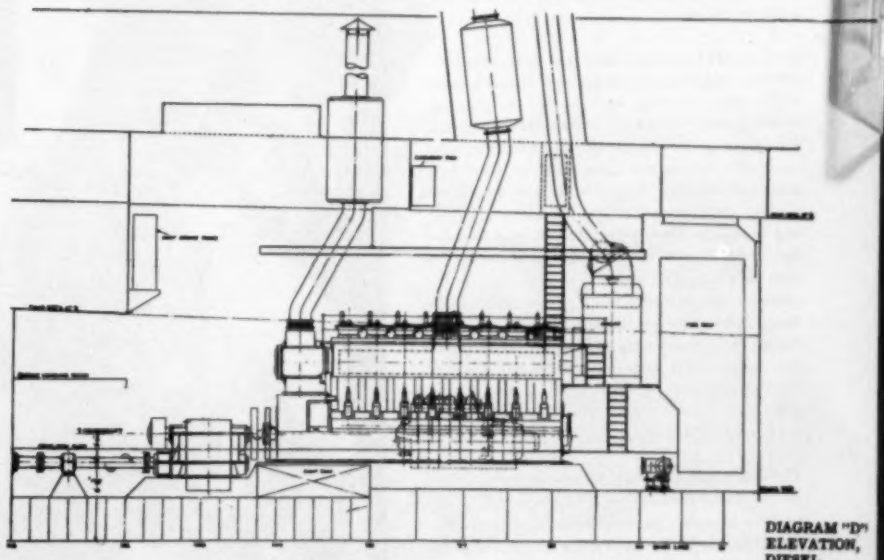


DIAGRAM "D" ELEVATION, DIESEL ARRANGEMENT

MORSE HY-VO DRIVE

A power transmission chain drive, of far-reaching significance to America's diesel manufacturers and users, has been announced by the Morse Chain Company. Featuring entirely new design principles and called Morse Hy-Vo (High Velocity) Chain Drive, it provides a power transmitting medium that combines the ruggedness and dependability of a gear drive with the smoothness and lack of vibration of a belt.

Opening new fields of possible applications in industry, Morse Hy-Vo can handle single drive units capable of transmitting as much as 5000 hp., at linear speeds up to 6500 feet per minute, or rotative speeds up to 3600 rpm. A Hy-Vo drive only two inches wide has transmitted as much as 500 hp. Due to the current critical shortages of necessary materials, it is necessary to restrict orders for the new drive only to those with defense or essential ratings.

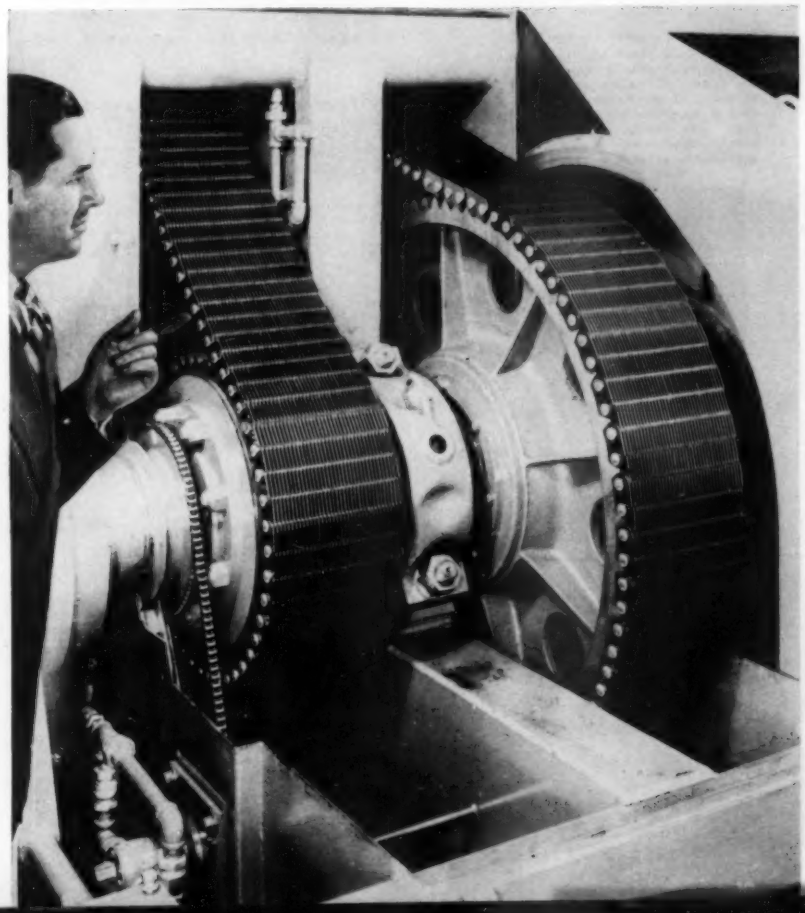
The Hy-Vo drive claims to give industrial users, and engine and motor designers, a power transmission drive that will allow them to develop and use smaller and more inexpensive power plants. Hy-Vo drives claim to increase efficiency and reduce power transmission costs in any field where single motors or engines are used in sizes of approximately 100 hp. and up.

The list of potential fields for Hy-Vo applications is almost endless, and includes commercial fishing, lumbering, petroleum, irrigation, mining, chemicals, paper-making, quarry operations, cement and asphalt manufacturing, and steel manufacturing—in fact, any field where a heavy-duty, high-speed drive is required. It is also suited for power transmission on heavier types of self-propelled mechanical handling equipment, for large fans and heavy-duty ventilating equipment, and for use in public utility installations.

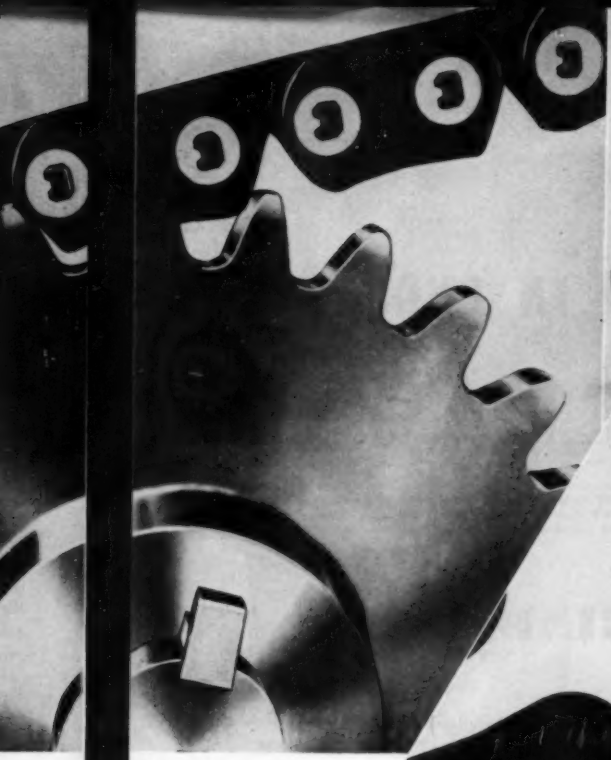
Secret of Hy-Vo performance is a new chain-and-sprocket engagement principle that virtually eliminates what is known as "chordal" or polygon action common to the usual chain drive—a bumping, slapping, jerking action and vibration that eventually fatigues the chain, leads to drive failures, and shortens chain life. It also limits the chain's performance. Hy-Vo sprockets also are new in design. They resemble involute gears, having curved involute teeth which engage the Hy-Vo links with conjugate action. The new chain incorporates a compensating rocking joint with special design features for eliminating slippage and wear. During chain articulation, the joint shifts the pitch-line automatically, engaging the involute sprocket teeth in such a way that the chain follows a path truly tangent to the sprocket pitch line. The result is a smooth, almost vibrationless action.

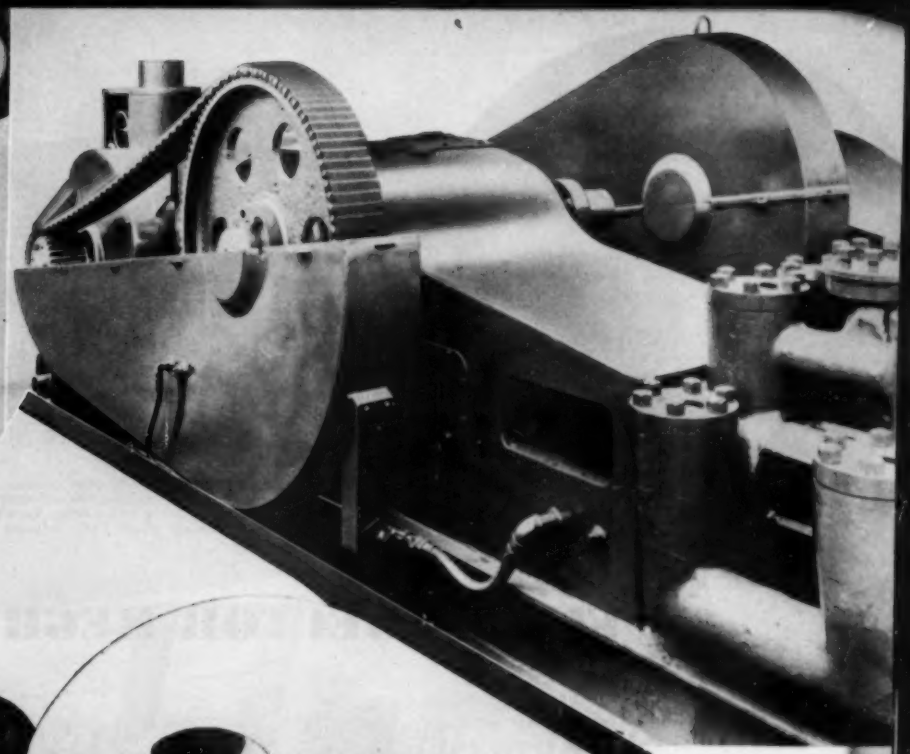
Pitch elongation or "stretch" has been eliminated in the Hy-Vo drive to the extent where it is virtually unnecessary to provide any means of take-up. Thus, Hy-Vo is ideal for use on drive applications such as engine compounding or heavy-duty power transfers where center adjustment is impractical. At high chain speeds, working loads twice as great as those normally used can be applied during sustained operation. This is due to the elimination of the "chordal' 'action that usually limits working load and maximum rotative speed. With full loads at any speed, the Hy-Vo drive is extremely quiet, and it runs very cool at all speeds and with an efficiency of over 99.5%. The Hy-Vo in no sense replaces present roller or silent chain drives, but supplements them. It is designed specifically for speed applications higher than conventional chain drives, and to replace unwieldly belt drives now required for high-speed power transmission. A 6-inch Hy-Vo drive, for example, will do the work of a 24-inch belt. At present Hy-Vo drives are being produced in one-inch, one-and-one-half-inch and two-inch pitches, in the most demanded chain widths. The range of pitches will be expanded as rapidly as possible.

The Morse Hy-Vo drive embodies a new principle of design. The sprocket teeth are involute in contour. The chain and sprocket engagement principle reduces shock loading and highly aggrevated stresses in the chain links, as well as noise, vibration and heating.

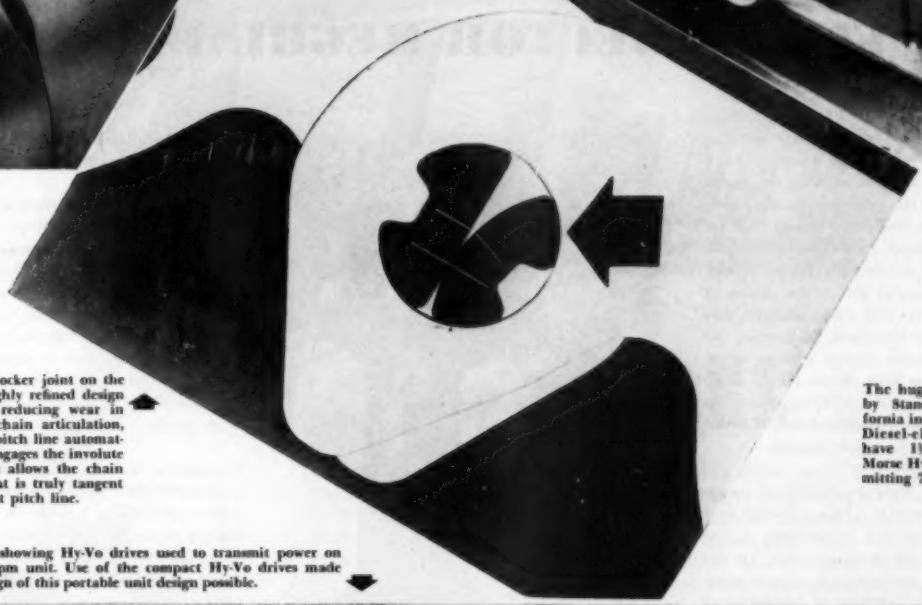


These two 2" pitch, 12" wide Hy-Vo drives transmit the terrific power needed by this new Diesel-electric drawworks designed to drill 20,000-foot holes. The 1500 hp., 600 rpm. drawworks was built for Standard Oil of California by EMSCO. The new Hy-Vo drives made possible for the first time construction of a portable Diesel-electric drilling unit of this size.



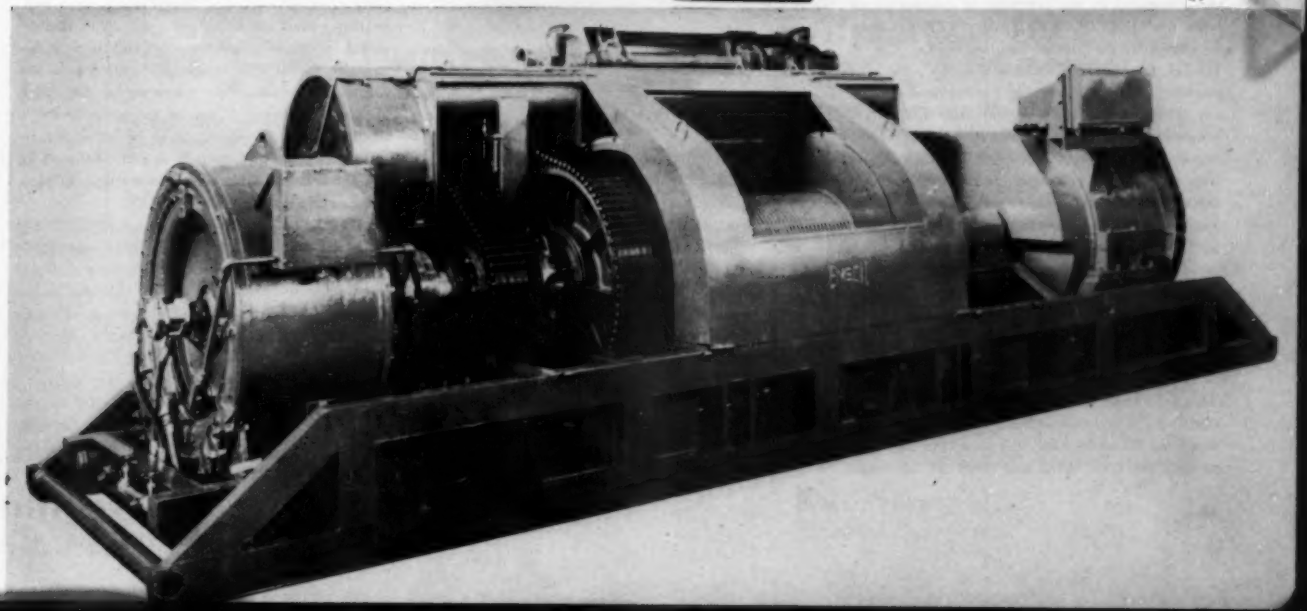


The compensating rocker joint on the Hy-Vo drive has highly refined design features for vastly reducing wear in the joints. During chain articulation, the joint shifts the pitch line automatically as the chain engages the involute sprocket teeth. This allows the chain to follow a part that is truly tangent to the sprocket pitch line.



The huge mud pumps, used by Standard Oil of California in connection with the Diesel-electric drawworks, have 1½" pitch, 8"-wide Morse Hy-Vo drives for transmitting 765 hp. at 1120 rpm.

EMSCO drawworks showing Hy-Vo drives used to transmit power on this 1500 hp., 600 rpm unit. Use of the compact Hy-Vo drives made the design of this portable unit design possible.



WHAT'S GOING ON IN ENGLAND

CONDUCTED BY **HAMISH FERGUSON**

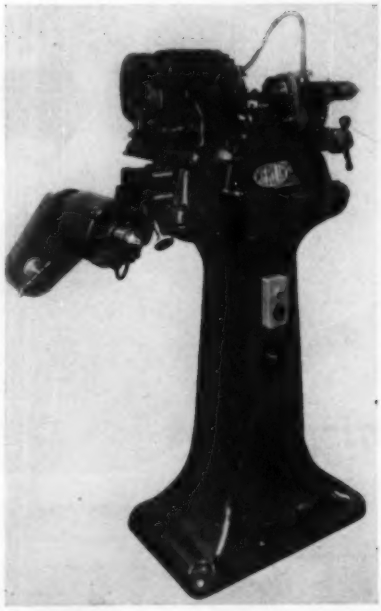
Hamish Ferguson was appointed Secretary to the Diesel Engine Users Association in London in 1944. Previously senior technical amistant to Diesel and Insurance Consultants, London, and for several years with English Electric Company in the designing and erection of large diesel generating plants. Mr Ferguson continues to do independent consulting work.

FUEL INJECTOR REGRINDING

IT is now generally appreciated that the most delicately made of the precision parts in a diesel are those making up the fuel injection equipment and probably the injector requires even more careful handling than the fuel pump though both are of paramount importance. In the past, many operators have made the mistake of trying to recondition their own equipment and in the process of lapping-in needle-valves and pump plungers they have done more harm than good. Discovering this it became their practice, except perhaps where large fleets of vehicles were operated by a single concern, to return worn and faulty equipment to the manufacturers for reconditioning. This has been, and will always be, a safe practice.

However, there are instances where the engine operator may be situated at a remote site far from the maker's factory and it is inconvenient or even impracticable to return defective parts. To suit such cases, and also particularly of value to workshops engaged in the overhaul of engines of all types the MERLIN SERVICEMASTER has been developed by the Merlin Engineering Co. Ltd. of Halifax, England. It is claimed that this is the only machine capable of grinding a point dead concentric with another portion and still maintain a pre-determined angle to within one minute of one degree. In addition, the machine can reface valve seats to any required angle, can regrind hardened tappets, rollers and pins, either taper or parallel, and can lap optic flats. The Servicemaster can deal with all sizes and types of injector needles normally encountered and if special fittings are necessary to handle American or Continental equipment it has been found that the manufacturer concerned will readily co-operate in supplying the required parts.

The Servicemaster is a self-contained unit of solid cast-iron construction incorporating its own rigid stand for floor-mounting. All slideways are made to high precision limits and there are additional



spring loadings. Double back-to-back angular-contact ball races are fitted in the wheel-head spindle, thus enabling it to run for a considerable period without adjustments, although adequate adjustment is provided. A four-jaw independent chuck is fitted to ensure the part being presented dead true to the wheel. This chuck is easily removed and a disc-type face plate is substituted, for carrying a rubber friction drive to the laps, thus increasing the lap length capacity by an extra 2½ in. to 3 in. The anvil is fitted with a 3⅛-in. adjustable high-speed tool-steel stop, which may be revolved or elongated as required. The work head is provided with adjustment to the spring-tensioning device enabling the rubber friction drive to be varied in accordance with the diameter of the lap, without the rubber fouling the vee blocks.

A special quickly fitted attachment is supplied to fit on the whole wheel head spindle incorporating a dial micrometer for trammelling a straight edge attached to the vee steadies. This is to ensure that the machine can be pre-set to grind an accurate angle of 60 degrees inclusive, this being the zero indicator setting, after which the vernier adjustment can be regulated as required for different angles. Extra grinding wheels are supplied for the Merlin machine for operations upon cast iron and other metals.

Mounted in line with the grinding wheel there is a diamond wheel dresser for truing the grinding wheel. An additional holder is also supplied for the use of the side and faces of the wheels when being used for purposes other than lap grinding. Fitted to one end of the machine bed is a turntable carrying a ½ hp. continuously rated ball-bearing electric motor (1400 rpm.) with double-ended shaft. Mounted on one end is a ⅜-in.-capacity Jacobs drill chuck for holding laps and nozzle needles. For easy operation of this chuck and its equipment a special twinging device is adapted allowing the motor to be set at the required position and securely locked. Mounted on the opposite end is an 8-in.-diameter lapping plate running at a speed of 500 rpm.

This new machine will deal with the correct angle grinding of 90 laps or needles per hour and will simultaneously permit a second operator to be lapping in seatings with laps or needles, or sizing or polishing needles where a selective assembly is employed.

Among users who have adopted the Merlin Servicemaster are to be counted a number of the large British engine manufacturers, some Services Departments and many public undertakings.

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ASHLAND OIL & REFINING COMPANY

ASHLAND, KENTUCKY

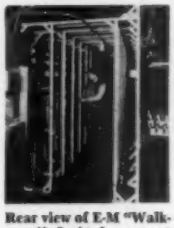
Navy Announces New Radial Type Diesel

The Navy's new attack submarines will be powered by an outstanding new radial type diesel engine which has been under development for the past five years, the Navy has announced. In cooperation with the Bureau of Ships, the new power plant was developed by the Cleveland Diesel Division of General Motors, Cleveland, Ohio. Actual manufacture of the first engine began in October, 1948. This engine is a 16-cylinder, 2-cycle diesel, mounted vertically with four rows of cylinders radially arranged, with welded steel construction throughout, it is the lightest diesel engine available in this power range. The radial construction made it possible to design the engine and attached accessories as an extremely compact unit, ideally suited to submarine requirements. The engines previously available for use in submarines were approximately twice as heavy and half again as large as this new engine. Several sets of these new engines are now being installed in the newest of the Navy's undersea boats. Further details on the new engine are classified.

New Diesel Locomotives Delivered

Two new 1,000 hp. diesel-electric switching locomotives for the Lehigh Valley Railroad Co. have been delivered by the American Locomotive Co. in Schenectady, N. Y., it was announced by Charles L. Patterson, vice president and general manager.

"Walkway" Switchgear for Diesel Plant

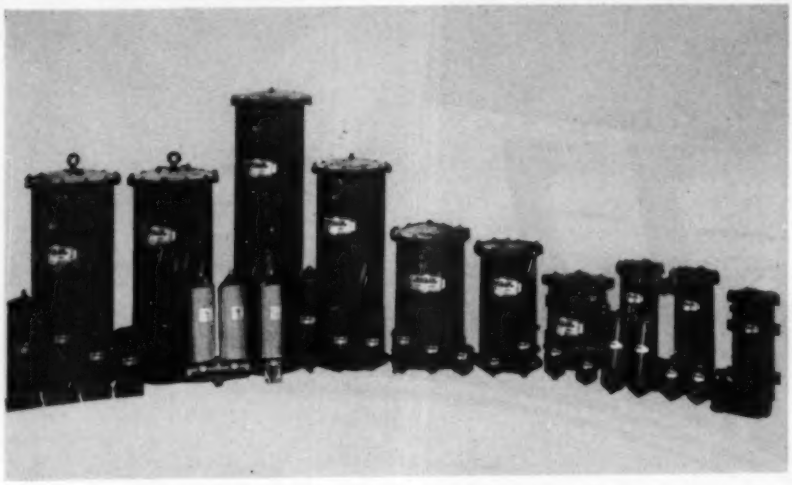


Rear view of E-M "Walkway" Switchgear at Barnesville showing 3-foot wide open center aisle running the length of the board.

The new Diesel-electric generating plant recently completed at Barnesville, Minn. features a new type of Switchgear with a built-in center aisle or walkway for safety and ease of maintenance. Built by the Electric Machinery Mfg. Co., the built-in center aisle feature of the switchgear combines the accessibility of the old "assembled-on-the-job" switchgear with the pre-engineered quality of the newer factory assembled types. E-M "Walkway" Switchgear is completely assembled and wired at the factory, but it does away with the compactness of most factory assembled switchboards by providing a three-foot wide center aisle for the entire length of the board. This effectively segregates high and low voltage equipment, facilitates inspection and maintenance, and minimizes the possibility of accidental contact with high voltage parts when maintenance work is being done. No appearance or safety features are sacrificed for this accessibility, for the entire unit is recessed so that the front of the panels are flush with the wall. The walkway is entered at one end through a locked door in the safety fencing which encloses sides and the back of the unit. It provides a well lighted, free working space for the operator, as well as complete safety and modern, clean appearance.

The ten panel board consists of: 1, swing panel containing synchronizing equipment; 2, voltage regulator and meter panel with Recording Voltmeter and Recording Kilowatt Meter; 2 generator control panels; 5 feeder panels; and 1 blank panel for a future generator. The new generating equipment in the plant includes two 606 KVA, 2400 volt, 485 kw, 0.8 leading power factor, 3-phase, 60 cycle, 450 rpm. Engine-Type Synchronous Generators with 50° temperature rise, also furnished by the Electric Machinery Mfg. Company. Excitation is furnished by two 10 kw, 1750 rpm, 125 volt, shunt wound, belted exciters with 40° temperature rise. The E-M Generators are direct-connected to two 694 hp, 450 rpm, supercharged Enterprise diesels.

DIESEL ENGINE CATALOG will be off the press this month in its Sixteenth expanded Edition. Completely revised and re-edited, it is an invaluable aid to design engineers and designers. ORDER COUPON ON PAGE 73.



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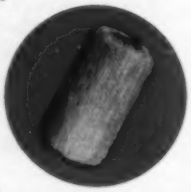

WRITE US FOR YOUR FREE COPY OF OUR EASY-TO-READ BOOKLET, *"THE CASE OF THE DIRTY DRIP."*

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Mobilizing Diesels

THE NATION wants peak production today. Much of the effort to achieve it must start at the source—with peak power output. So there's a big role to be played by Diesel engines. That points up an urgent duty of all those concerned with any Diesel operation: to re-examine not only their Diesel lubricants, but their entire Diesel lubrication practice!

Significant direct savings of oil can be made with the excellent lubricants Cities Service produces for all types of Diesels . . . for all operating conditions. But even more important is the power conserved . . . the saving of down-time—replacements—maintenance . . . and the improved production such savings permit.

A well-established way to make sure of Diesel lubrication that effectively contributes to peak power output . . . helps maintain it even under adverse conditions . . . is to consult a Cities Service Diesel lubrication specialist. He's fully qualified by intensive training and by wide experience with all types of Diesels. And he's readily available on request. Address CITIES SERVICE OIL COMPANY, Room 13, Sixty Wall Tower, New York City 5. Write. Or phone your nearest Cities Service office.

CITIES SERVICE

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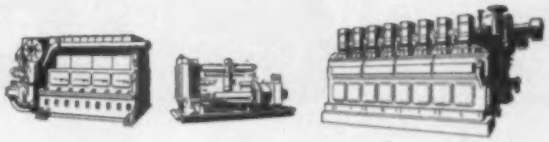
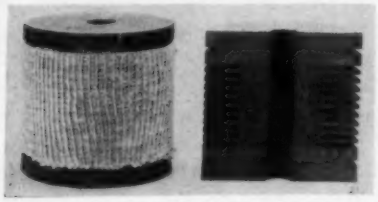
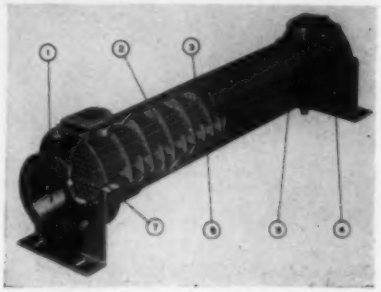


Cellulose Oil Filter



A new oil filter, using molded cellulose fibers as the medium, has been developed by The Briggs Filtration Company, Washington, D. C., according to information released by F. S. Ehrman, president of the company. A bonding agent is applied to natural cellulose materials which are formed, under pressure, into "cartridges" of blocks. The size of the fibers controls the porosity of the block. The blocks are then stabilized by a series of thermal processes which fix the finished dimensions. The blocks are rendered impervious to water and therefore retain their original dimensions in use. Laboratory and field tests on the blocks have been in progress for several years, and reports show that the new medium has a higher dirt retention capacity than any known materials, and that there is no "unloading" action between filtration cycles. The overall efficiency and long life of the new filters are therefore considered quite unusual. Production is currently under way and complete filters are available in addition to replacement cartridges for standard makes of automobile, truck and heavy equipment filters. Distribution is through Briggs distributors and regional sales offices.

New Line of Torque Converter Coolers



Torque converter coolers manufactured by the Young Radiator Company, Racine, Wisconsin, and Mattoon, Illinois, are available in four models, engineered for cooling applications with engine ratings from 100 to 450 hp. Typical features in the Young designed and built units are illustrated above: 1. Smooth inlet and outlet flow with minimum impact on headers is assured by the Young-designed bonnet castings. 2. Engineered baffle-spacing provides proper turbulence of fluid for maximum heat transfer. 3. Non-ferrous tube bundle enables unit to be used in either fresh or salt water installations. 4. Units are compact and designed for either horizontal or vertical mounting. 5. Accurate ratings and reserve capacity prolong life of service. Assembled from standardized parts, original and maintenance costs are minimized. 6. Precision-matched parts eliminate by-passing—step-up heat transfer efficiency, making possible a more compact unit. 7. Die-formed header means less weight, greater strength.

For further details, including ratings, design features, etc., write Young Radiator Company, Racine, Wisconsin, requesting Catalog No. 1051.

Elected President of Snow-Nabstedt

A. T. Nabstedt

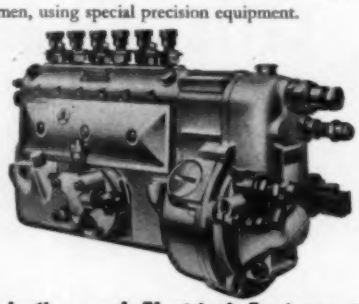
The Snow-Nabstedt Gear Corporation of Hamden, Conn., at a recent meeting of its board of directors elected Mr. A. T. Nabstedt as president and chairman of the board. Mr. D. M. Pierpont was elected first vice president; Mr. Tracy S. Nabstedt, vice president in charge of production; Mr. D. R. Thompson, treasurer; Mr. A. T. Nabstedt, Jr., secretary.

Confidence Abroad

Transport operators all over the world have learnt to trust this sign.

In any language the letters on the C.A.V. sign stand for first-rate service facilities, maintained by highly-trained craftsmen, using special precision equipment.

Wherever vehicles fitted with C.A.V. Fuel Injection Equipment are exported — whether to Trondheim, Santiago, Hong-Kong or Sydney — there's a service agent or depot to give it the specialist attention needed for such high-precision equipment.



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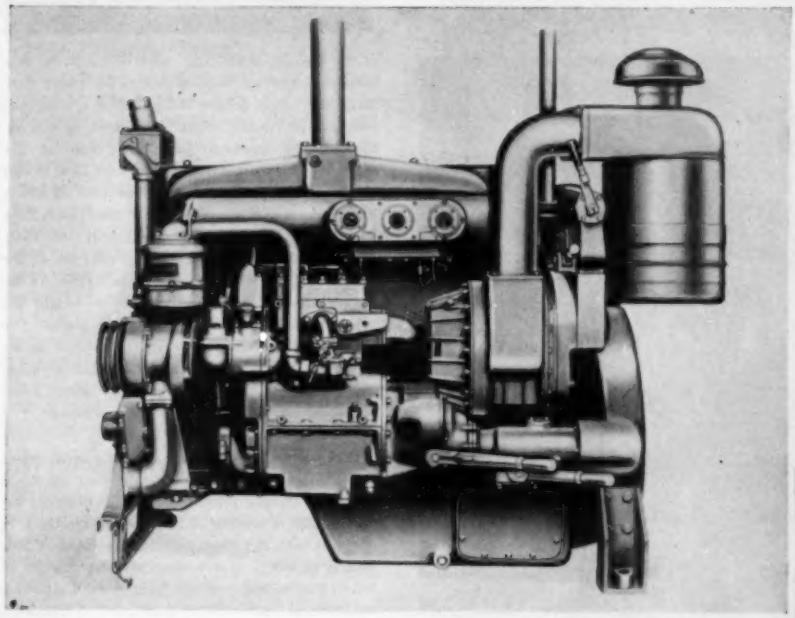
NEW CAT DIESELS

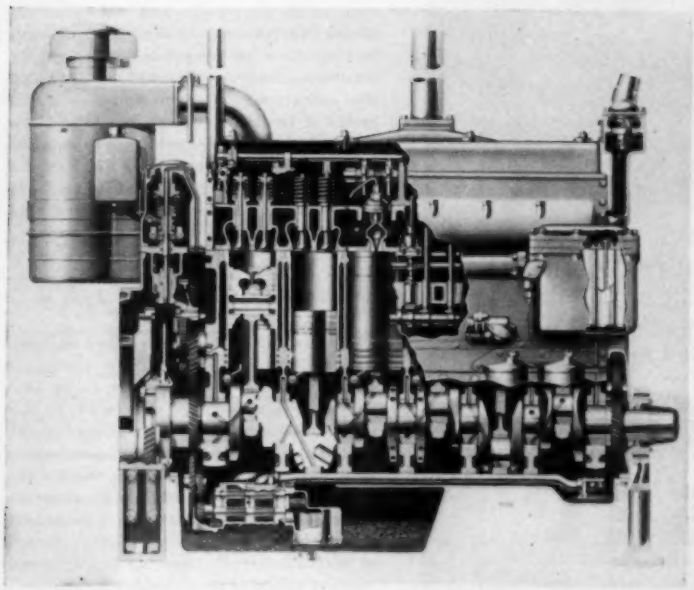
TWO new Caterpillar industrial diesel Engines, are scheduled for production mid-year in 1951. Here is advance information concerning their design and performance characteristics, both engines having many new design features which were thoroughly job-tested, before acceptance for production. The six-cylinder D337 engine is an industrial version of the 5¼"x6" engine developed as a power source for the DW20 and DW21 tractors.

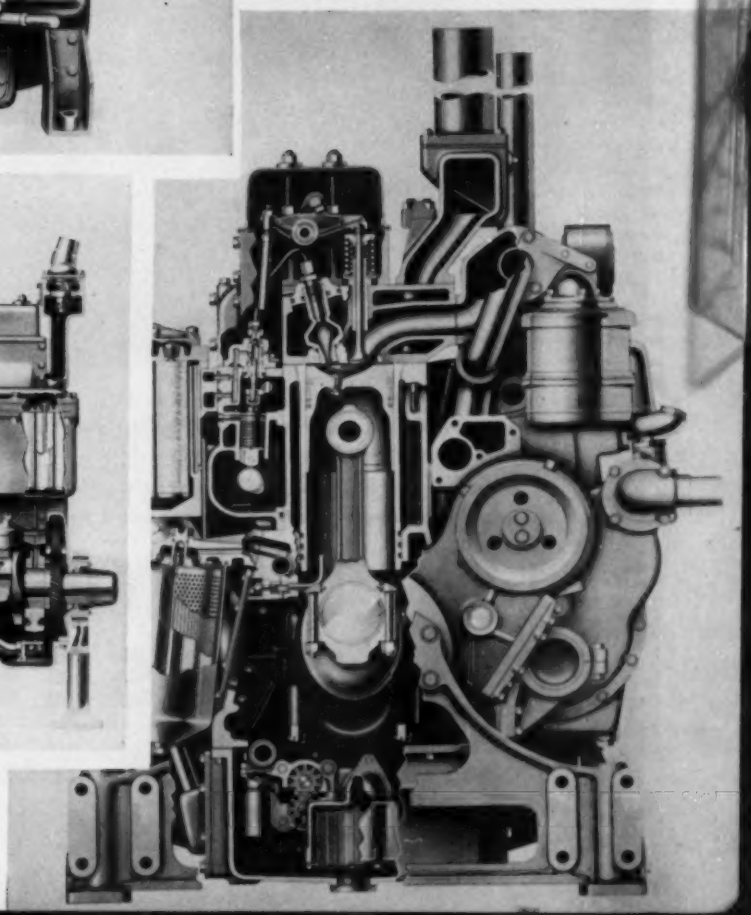
The D326, although quite similar in design, will be offered with a lower horsepower range.

One new feature on the two models is the fuel system with fuel pumps mounted adjacent to the cylinders they serve. This results in standard, identical, short fuel lines for each cylinder. Oil cooled pistons have long been standard on "Cat" engines, but a new arrangement has been used on the D337 and D326. The pistons, which have an iron band cast integrally for the upper ring, are cooled by an oil stream sprayed from a nozzle that is solidly attached to the engine block. Since this spray lubricates the piston pin, as well as cooling the piston, oil grooves are not required in the connecting rod. For the first time on a production engine, Caterpillar is incorporating fine filtration elements which handle the full flow of oil to the engine system. Most important is that oil passageways are protected from dirt and foreign material falling into them while filter elements are being changed and the fact that any sludge will collect at the bottom of the cams where it cannot possibly enter the oil passageways or relief valves.

A completely redesigned 25 horsepower vertical gasoline starting engine is used with the D337 and D326 engines. This new starting engine has several new design features to provide easier starting, regardless of weather conditions. These include crank throws located adjacent to each other to give an even firing design, an up-draft carburetor to provide easier hot starting, as well as excellent cold starting, and a wet type clutch to provide longer life with less adjustment. Horsepower ratings for the new engines (without fans) are as follows: D337—170 hp. to 275 hp.; D326—118 hp. to 186 hp.







Appointed Chief Engineer

John C. Wallace

Appointment of John C. Wallace as chief engineer for the newly created diesel parts research and development division of Hunt-Spiller Manufacturing Corp., Boston, has been announced by A. J. Edgar, vice president and general manager. Prior to joining Hunt-Spiller, Mr. Wallace was special projects development engineer with Baldwin-Lima-Hamilton. A native of Pittsburgh, Mr. Wallace graduate from Yale University in 1942 with a degree in mechanical engineering. During World War II he served with the Navy as a lieutenant and holds a certificate in naval architecture from the Navy's postgraduate school at the University of Michigan. Mr. Wallace joined the Bessemer & Lake Erie Railroad Co. as a draftsman in 1946, and in its equipment maintenance department did extensive work on diesel application. In 1948 he became associated with Lima Hamilton Corp. as an engineer in the locomotive design section. A year later he was sent to India to consult with the Indian Government Railways on diesel design and construction. In 1950, as an engineering department representative, he was adviser to the corporation's sales department on diesel application. Following the Baldwin, Lima Hamilton merger he was transferred to Eddystone, Pa., as development engineer.

Road Switcher

The Alco-GE 1600 hp. road switcher is now available with six traction motors for heavy duty drag and hump service and in other applications where high tractive effort is required, it was announced by American Locomotive and General Electric. This road switcher is the same basic design as the Alco-GE four-motor road switcher, of which more than a million-and-a-quarter horsepower have been delivered to the nation's railroads since 1945. The two three-motor, three-axle trucks are of the drop-equalizer, modified swivel type. They are designed for ease of maintenance, equal weight distribution and smooth riding at high speeds. The truck has been designed so that the center motor is fully accessible for all inspection and servicing. Adequate working space within the truck frame at both ends of the center motor is provided.

Truck design is a departure from the usual swivel type. A center plate, offset from exact center, is used as a turning point as in regular practice, but carries only a portion of the load on the truck as the two loading pads support the remainder. This results in equal axle loading despite changes in load. The loading pads are fixed to the locomotive underframe and slide on load carrying plates located on the truck frame. Both center plate and loading pads operate in oil baths. Arrangement of long equalizers and deep-deflection springs contributes to smooth riding at speeds up to 60 mph. The spring system of the truck consists of four groups of two helical springs each, located near each end pedestal. The truck frame is supported on these springs which in turn are carried on four sets of double, drop-center equalizers extending from the end axles to the center axle. Desired equal axle loadings are attained by proper positioning of springs along the spans of the equalizers and by proper proportioning of the springs. Friction type snubbers are applied in one spring of each group.

The center plate of the truck is located on a cross transom between two motors. The loading-pad bearing surfaces are located similarly on the other transom at the opposite end of the truck. By placing the load carrying members between motors, advantage is taken of the deep transom sections for carrying the load to the side frames. This allows low overall truck height and enables use of the same basic locomotive design as the Alco-GE four-motor road switcher.

Standard weight of the six-motor road switcher is 360,000 pounds, but it can also be supplied with

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total weights of 270,000, 280,000, 300,000 and 325,000 pounds. The locomotive has a continuous tractive capacity of 78,750 pounds at 5.5 miles per hour, using 74:18 traction motor gearing. This compares with 52,500 pounds tractive effort at 8.5 mph. of the Alco-GE four-motor road switcher. Tractive effort of the new model is equivalent to 21.8 per cent adhesion with maximum locomotive weight of 360,000 pounds. The locomotive has a maximum permissible speed of 60 mph. and may be used in freight or passenger service. For branch line work, where light rail and bridge limitations are encountered, the locomotive can be furnished in lower weight ranges. The first three six-motor units were delivered to the Chicago and North Western Railway Co. in April.

Diesel Designer Retires

April 6 marked the retirement of a pioneer diesel engine designer, William A. Horthy, research engineer at International Harvester Company's Melrose Park plant. He retired on his 65th birthday after forty-one years with Harvester. Mr. Horthy came to America in 1909 after graduation with a B.S. degree in mechanical engineering from the Technical College of Budapest, Hungary. A year later he became a draftsman in the original Harvester tractor works, a garage on the southeast corner of Western and Blue Island Avenues in Chicago. Most of his career was devoted to working on designs that would burn cheaper-grade fuels more efficiently. Mr. Horthy planned a three-week vacation before starting a new career of technical writing on diesel engineering theory for textbooks and lecturing.

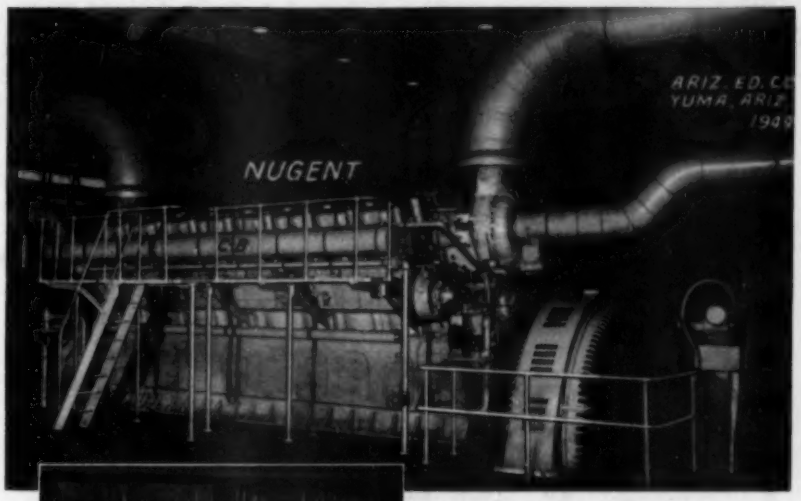
Off the Press This Month

"Where an entire industry, with but one thought in mind, meets to BUY" is how one lyrical user so aptly describes DIESEL ENGINE CATALOG. Now, volume sixteen, larger by some fifty pages than last year's edition and completely re-edited from cover to cover, will be ready to go into the mails July 14th. Its a new book with much new material, many changes in engine ratings, speeds and sizes. And the same thing applies to the accessory section—new models, new tables, some entirely new sections. Volume 16 is a completely revised, big, useful book—11 inches by 14 inches—with over 400 pages and, despite an almost 100 percent increase in costs in the past five years, the price remains the same.

DIESEL ENGINE CATALOG has become the indispensable reference book of a big, healthy industry. Last year, for example, one engine company bought 238 copies, one for each diesel field salesman, an oil company purchased 79 copies for its field industrial salesmen, 581 copies went into consulting engineering offices, another 655 copies went to railroad purchasing and engineering offices, and 728 copies went into government procurement offices—federal, state and county.

You will want this volume sixteen of DIESEL ENGINE CATALOG. To be sure of your copy of this limited edition, send your check for $10.00 (plus sales tax if for delivery in California) to DIESEL PROGRESS, P.O. Box 8458, Cole Station, Los Angeles 46, California. Or, if you wish to be billed, send a company form order.

Where dependability
is essential . . .



Typical of the dependability requirements that make Nugent filtering a must is this diesel power plant located at Yuma, Arizona, owned by the Arizona Edison Co. The Cooper-Bessemer engine shown in the large illustration is equipped with a Nugent Fig. 1280A size No. 4L4 lubricating filter mounted below the floor (see smaller illustration).

NUGENT OIL FILTERS are a must!

The best protection your diesels can have is dependable filtering equipment for fuel and lube oil. Nugent absorbent depth type pressure filters fill this bill. Carefully controlled tests show that Nugent Absorbent Filters remove 99.8% of the harmful impurities that can get into your oil. This is the type of filtering that greatly extends the life of all the moving parts in your engines and results in substantial savings of oil, as well.

There is a size and type of Nugent filter to meet every requirement, whether it be for diesel fuel or a turbine lubricating system. Whatever your need, it will pay you to take advantage of Nugent's long experience and filtering "know-how". Write today for complete information, outlining the nature of your problem. It's the first important step toward lengthening the useful life of your equipment.

Wm. W. Nugent & Co., Inc.
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OIL FILTERS, OILING AND FILTERING SYSTEMS, TELESCOPIC OILERS, OILING DEVICES, SIGHT FEED VALVES, FLOW INDICATORS

Leece-Neville Expansion

Acquisition of additional manufacturing space for its expanding business has recently been announced by The Leece-Neville Co., makers of automotive electrical equipment in Cleveland, Ohio. Some 16,000 sq. ft. of new floor space will be devoted to light manufacturing divisions. Currently some 60% of Leece-Neville business consists of D. O. rated orders, it is stated. In addition to this participation in the defense program, the company has had a substantial increased in its commercial business. Known especially for the L-N ac-dc alternator system, Leece-Neville also makes heavy-duty generators, motors, regulators and switches. Its replacement heater motor also enjoys increasing popularity. Included in the announcement was the acceptance by the board of directors of the resignation of S. F. Stewart as president. Direction of the business will continue under the same management as before, with emphasis on efficiency, it was stated.

Texas & Pacific RR Adds 20 Diesels

Texas & Pacific Railway directors have authorized the purchase of 20 more diesel locomotives which when delivered in the first quarter of 1952 will result in the system's motive power being fully dieselized. W. G. Vollmer, president, said the new authorization covers six 1,500 hp. freight units, six 1,500 hp. road switchers, and eight 800 hp. switching locomotives. With delivery of these new locomotives, T. & P. will have 203 diesel units in service.

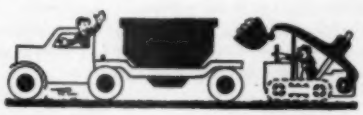
Delivers First Dozers

First of five TD 24 hydraulic dozers built by Pullman-Standard Car Manufacturing Company since acquisition of the Isaacson Iron Works road equipment division, is shown above being shipped from the Hammond, Indiana, plant of the company. Tractors are shipped from International Harvester's nearby Melrose Park, Illinois, plant to Hammond, which allows Pullman-Standard to attach its road equipment and ship the complete unit to customers.

New Factory

Ralph R. Layte, president of Purolator Products, Inc. of Rahway, N. J., pioneer manufacturer of oil filters and other types of filtration equipment, announced recently that his company will increase production in the early Fall when a new and modern factory will be opened up in Ringtown, Pa. Decision to operate an additional plant in Pennsylvania was reached because of increased orders for Purolator oil filters and elements which have been coming in from automotive and farm equipment manufacturers, Mr. Layte said. The increased production facilities will also enable Purolator Products, Inc. to continue as a major supplier for the Armed Forces.

Headquarters of Purolator Products, Inc. will remain at Rahway, N. J. and all production in the additional Ringtown, Pa. factory will be carried out by local labor. Farm and automotive filters will be manufactured in the new Pennsylvania plant. Purolator's new factory is a community-built manufacturing building recently erected under the leadership of the Chamber of Progress of Shenandoah, Pa. A one-story building of cinder block construction with brick veneer facing, it contains 40,000 square feet of floor space and is located on a 10 acre site in Ringtown Valley, four and a half miles northeast of Shenandoah.



. . . because they keep the lube oil clean— physically and chemically

THE GRACE MORAN

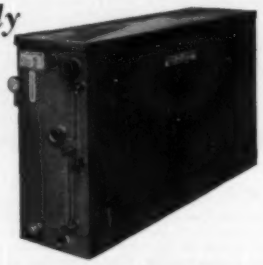
The "GRACE MORAN," other Moran tugs and many other vessels, power plants, railroads and transport lines have proved over the years that Briggs Oil Clarifiers improve engine performance by keeping lube oil clean.

BRIGGS offers the RIGHT FILTER for every diesel engine.

PROVE IT YOURSELF

Send us a sample of your oil and engine specifications. We will gladly make a laboratory test and give you our engineers' recommendation—no obligation, of course.

A Briggs Catalog belongs in your file—write for one NOW!



BRIGGS CLARIFIER—MODEL CD (Filter, Strainers and Oil Storage Tank—in one unit)

THE BRIGGS FILTRATION COMPANY
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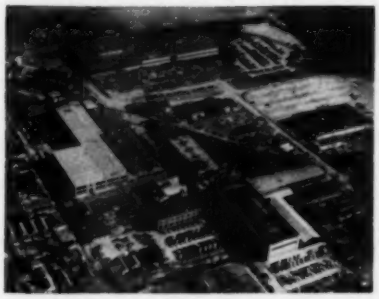
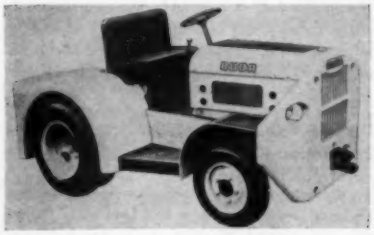
FOR MORE THAN A QUARTER CENTURY

Expands Facilities



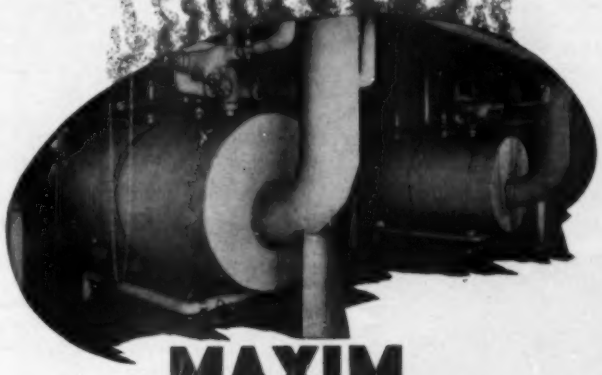
Cummins Engine Company, Inc., at Columbus, Indiana, is expanding. The structure—upper center in the photograph above—nearing completion is the new stores center building. Its 92,000 square feet of floor space (2.1 acres of land under one roof) and an extension of 9,600 square feet to the 19 month old DD fuel pump building—left center —will increase the size of the plant by more than 30 per cent . With the completion of the new buildings, Cummins will have expended more than $6 million for additional manufacturing facilities and for modernizing the Columbus plant, while at the same time increasing production capacity for Cummins diesels by 60 per cent in a period of five years.

New 12,000 Lb. Drawbar Pull Tractor



A new 12,000 lb. drawbar pull tractor with torque converter designed to handle all airline, railroad, industrial or military tough pushing and pulling jobs is now being manufactured by The Buda Company, Harvey, Illinois. The new Buda model HA-120 Shop Mule tractor with a single stage, closed circuit type torque converter eliminates shock and undue strain and smoothly applies maximum power even when starting under full load conditions. The HA-120 tractor is powered with a 6-cylinder, 230 cubic inch displacement Buda model 6-BD-230 diesel engine of the same displacement as optional power. Features include a torque converter, 12,000 lb. drawbar pull, (13,000 lb. drawbar pull with wheel weights), four-wheel hydraulic brakes, positive heavy-duty transmission with four forward and one reverse speed, 17 gallon Protectoseal fuel tank, adjustable seat and dual pneumatic drive tires. Illustrative Buda bulletin No. 1545 gives full details and will be supplied on request to the company.

IS WASTE HEAT WASTING YOUR MONEY?

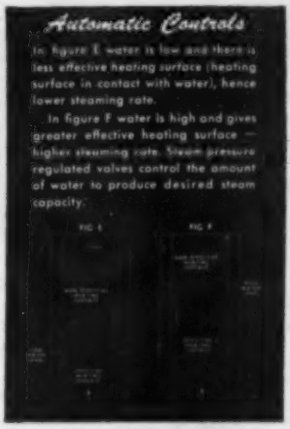


MAXIM

HEAT RECOVERY SILENCERS CONVERT WASTE EXHAUST HEAT TO USABLE STEAM or HOT WATER

A big Los Angeles Sewage Disposal Plant found that Maxim Heat Recovery Silencers provided all the steam necessary for plant heating as well as heating the sludge — *and from exhaust heat that would otherwise have been wasted.*

Perhaps your own operating expense picture can be improved by this simple and effective way to provide extra steam or hot water for heating or processing operations while at the same time effectively silencing exhaust noise. Our engineering department will be glad to make recommendations.


Automatic Controls
In figure E water is low and there is less effective heating surface (heating surface in contact with water), hence lower steaming rate.
In figure F water is high and gives greater effective heating surface — higher steaming rate. Steam pressure regulated valves control the amount of water to produce desired steam capacity.

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Gentlemen: Please send me your Bulletin on Heat Recovery Silencers

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Appointed Manager Export Sales

Frank L. Johnson

Frank L. Johnson has been appointed manager of export sales of the National Supply Company's Engine Division, according to an announcement made by Mr. F. H. Kilberry, general manager of the division. Mr. Johnson graduated from the California Maritime Academy in 1938 with a Bachelor of Science degree in Naval Science. Upon graduation, he was employed with the Coast and Geodetic Survey for a period of six months until joining the American President Lines where he worked in the operations department. Mr. Johnson remained with this concern until 1941 when he joined the U. S. Navy for a period of five years. In 1946, he joined Frazer and Hansen, Ltd., in San Francisco where he handled export sales of diesel engines and other industrial equipment. Beginning with June 1, Mr. Johnson made his headquarters at 600 Fifth Avenue, New York 20, N. Y.

Big Diesel Truck Future Forecast

The trend in the trucking industry toward the use of diesel trucks is continuing at a rapid pace in 1951 and the future heavy duty field looks predominantly diesel. H. B. Ford of the GMC Truck and Coach Division told a meeting of Northern California section, Society of Automotive Engineers, in San Francisco recently. The swing toward diesel is contrasted against sales in 1938, when diesel truck sales totaled only 489, edged up to almost 2,000 in 1946, then soared to 12,669 in 1950, Mr. Ford pointed out. He added that GMC diesel trucks are now one of the leaders in the overall field. Mr. Ford, a diesel authority who was director of the GMC diesel service training school at Oakland, California for several years, traced for engineers not only the tremendous increase in diesel truck sales over the past 13 years but went into the story of General Motors' research and development of its famed 2-cycle diesel engine design.

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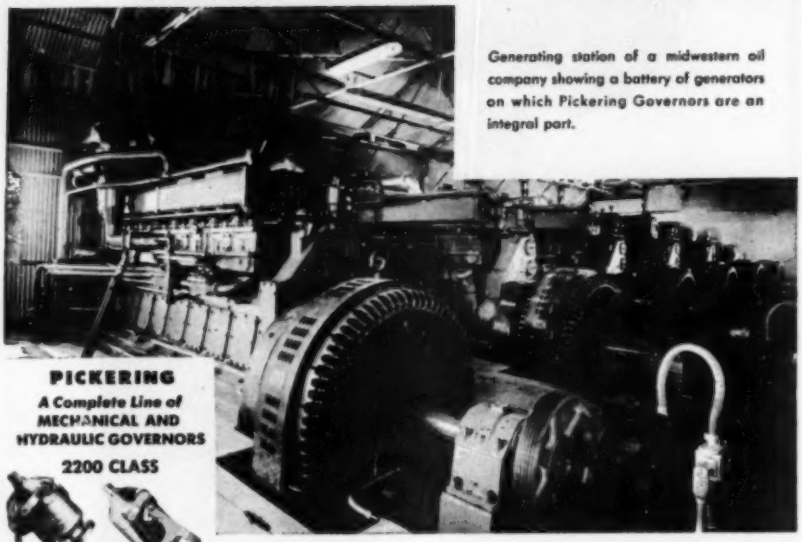
Synonym for dependability since 1862



Generating station of a midwestern oil company showing a battery of generators on which Pickering Governors are an integral part.

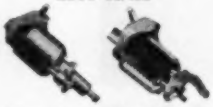
PICKERING

A Complete Line of MECHANICAL AND HYDRAULIC GOVERNORS

2200 CLASS

Constant Speed Variable Speed

2600 CLASS



Constant Speed Variable Speed

3200 CLASS

Constant Speed Variable Speed

3700 CLASS

Constant Speed Variable Speed

For 89 years, Pickering Governors have met and anticipated the needs of American Industry. They have more than established a reputation for fully-dependable, long-term service under every type of operating condition.

Today, Pickering stands ready to supply the right governor for the job – to supply the governor that will maintain operating efficiency at its peak regardless of service conditions.

To consult Pickering Engineers may be your passport toward more efficient and economical operation of diesel equipment.

THE PICKERING GOVERNOR CO.

Established 1862

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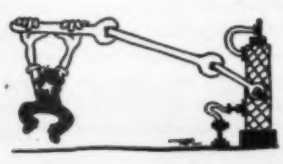
7614

New Type Temperature Regulators

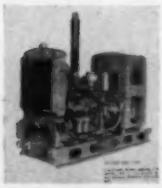
A new series of temperature regulators, designated as No. 999, has been announced by Fulton Sylphon Division, Robertshaw-Fulton Controls Company, Knoxville, Tennessee. This series of regulators is an important addition to the line of self-powered controls on which this company has specialized for almost a half-century. This series of regulators has a press-formed frame of stainless steel—providing maximum heat conduction from valve to regulator head. Temperature ranges start at 40°F; end at 440°F. They are available in valve sizes ½-inch to 4-inches inclusive. Illustrated is the type of bulb used for liquids but supplied on order with fin type bulb for air or gases. Also available with indicating thermometer and other special features to suit most any installation requirements. The manufacturer will send descriptive literature on request.

Diesels For Anticipated Population Growth

To provide for municipal water supply and industrial and residential power and light for a 100,000 population which Tangier, North Africa, expects by 1956, Worthington Pump and Machinery Corporation has provided two 1370 hp. diesel generator sets with SEH-6 engines and Electric Machinery generators. The two new diesel generators, each rated at 950 kw. will also normalize the water, light and power services for the international zone's present 75,000 inhabitants. The present power plant in this important Mediterranean port is equipped with two Italian made engine generators; one 2200 hp. and the other 1700 hp., which together with the new Worthington units will work in parallel. The new Worthington units will replace one 1,000 hp. and two 500 hp. engine generators.



Micro-Wave TV Transmission



The Hercules Model DJXH powering Western Electric microwave-relay generator set.

The advent of commercial development of radio relay has brought about another new requirement for gasoline and dieselized electric generating equipment. These units are used to meet the need for standby power at many micro-wave relay towers which already are flashing television programs across large sections of the nation and soon will be transmitting telephone messages as well. Micro-wave relay towers for transmitting telephone messages and television picture images have been widely used as an alternative to coaxial cable extensions, and many densely populated areas of the nation owe their ability to receive "live" television broadcasts to the rapid expansion of microwave-relay systems. In fact, about half of the total television channel mileage is provided by radio relay and half by coaxial cable.

In most instances, local power lines are available for the operation of microwave towers which perform the dual functions of receiving the picture image at one horizon limit and transmitting them onward to any desired point within its line of sight. But the importance of the dependable functioning of the relay tower is so great that standby electric power generating equipment is universally used which activates itself in the event of a local power failure. Wherever power is not available locally or where the amount of available power is not sufficient, two engine powered generator sets are often used alternately, the idle one serving as a standby unit. A number of these engine powered generator sets are in operation between New York and Boston, Toledo and Detroit, Chicago and Milwaukee, Cincinnati and Dayton, Dayton and Columbus, Buffalo and Rochester, Albany and Syracuse. Now, with the expansion of television westward into more isolated areas with limited power supply, the unusual merits of the diesel engine as a means of dependable, economical power has been given wide and serious consideration. For years, diesels have been capable of functioning dependably without constant watching and without any degree of "hand-holding" care. But the development of communication equipment that must function dependably for months at a time in isolated areas, and in some seasons of the year difficult of access, poses a new set of needs.

A generator was developed by the Hercules Motors Corporation of Canton, Ohio, and powered by a Hercules Model DJXH 6-cylinder diesel with a 3¾-inch bore, 4½-inch stroke and piston-displacement of 298 cubic inches. It was developed primarily for maximum reliability and smoothness of operation, combined with high economy inherent to diesel engines. The first installation of diesel engined generator sets at a microwave-relay station is at Omaha, Nebraska, and consists of four Hercules units. Other installations are planned through Utah, Nevada, Virginia, Alabama, Mississippa and throughout Texas. Where localities do not have a power supply, these units can be used to operate the television broadcasting station itself.

The right ratio of surfaces—the right materials—the right velocities—the right proportion between coil area and depth . . . there are dozens of factors that affect the efficiency, maintenance and service life of heat-exchange coils.

For best performance in your own application, the practical approach is to take full advantage of the unequalled engineering, research and design skill—the unequalled manufacturing and testing facilities—which Aerofin offers you.

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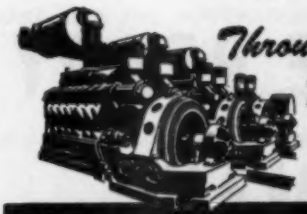

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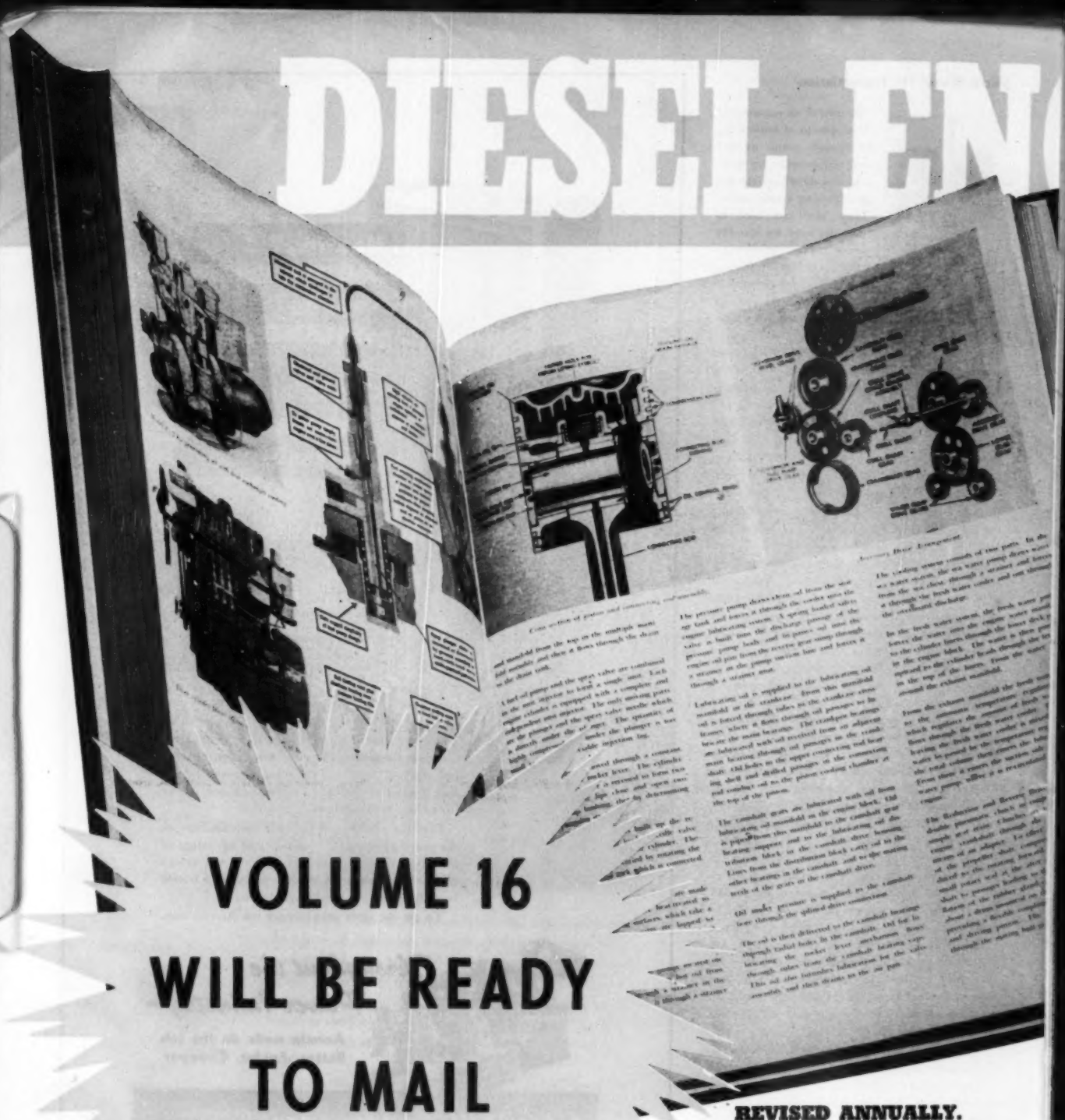

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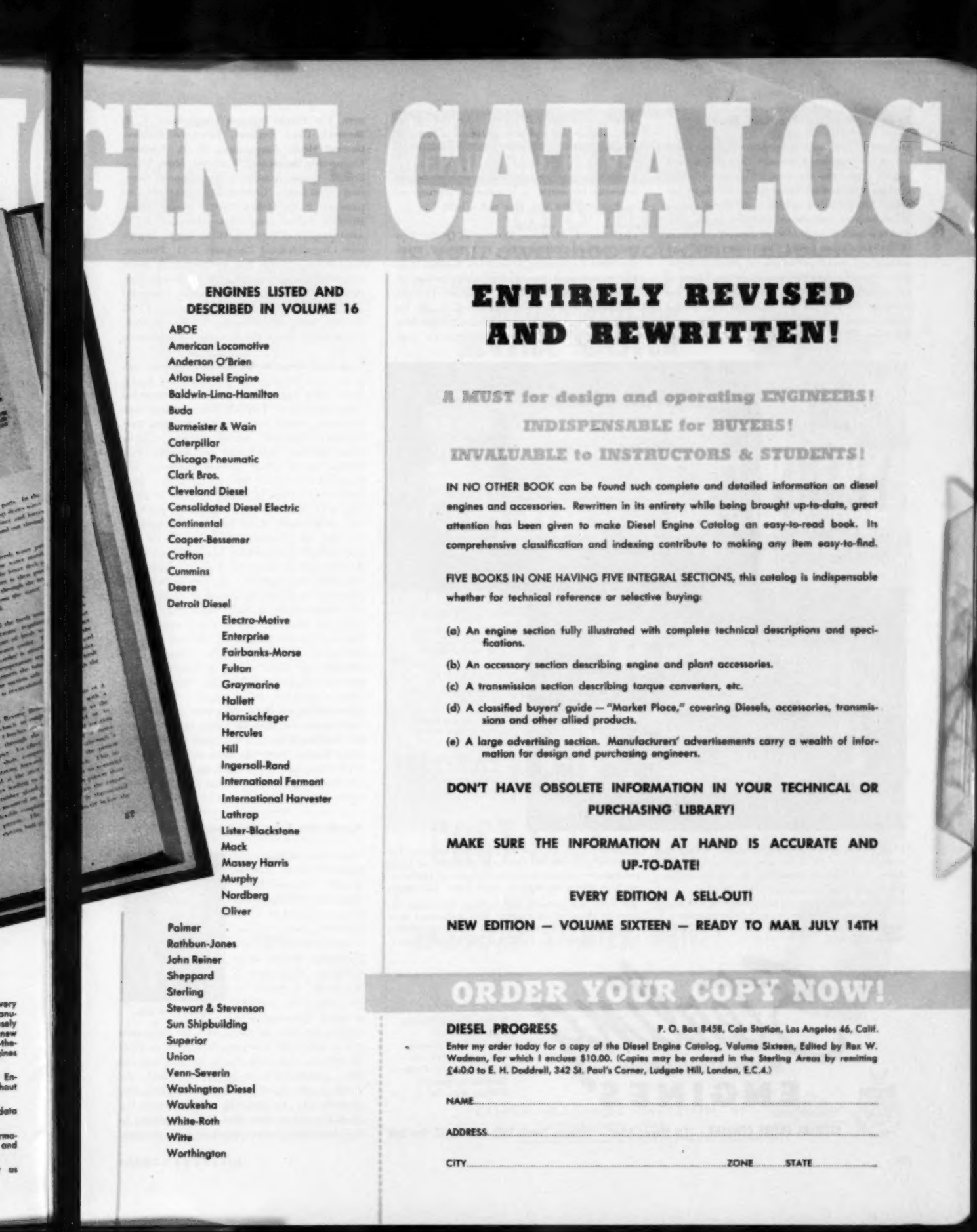
This comprehensive book is brought up-to-date every year. Carefully revised and checked by the manufacturers themselves, its complete and profusely illustrated data include numerous changes, new types and models and re-designs with up-to-the-minute information on diesel and dual-fuel engines manufactured in this country.

Design and Consulting Engineers keep Diesel Engine Catalog at hand for easy reference throughout the year.

Product Engineers find its accurate, easy-to-find data of great value.

Engine operators use its wealth of factual information as an invaluable aid to good maintenance and service.

Technical Instructors and Students consult it as an unsurpassed reference book.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A MUST for design and operating ENGINEERS!
INDISPENSABLE for BUYERS!
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IN NO OTHER BOOK can be found such complete and detailed information on diesel engines and accessories. Rewritten in its entirety while being brought up-to-date, great attention has been given to make Diesel Engine Catalog an easy-to-read book. Its comprehensive classification and indexing contribute to making any item easy-to-find.
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Enter my order today for a copy of the Diesel Engine Catalog, Volume Sixteen, Edited by Rex W. Wadman, for which I enclose $10.00. (Copies may be ordered in the Sterling Areas by remitting £4:0:0 to E. H. Doddrell, 342 St. Paul's Corner, Ludgate Hill, London, E.C.4.)
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Revises Standard Practices Book

Because of progressive developments in the diesel engine manufacturing industry, it again became necessary to revise the book, "Standard Practices for Low and Medium Speed Stationary Diesel Engines," first published in 1935 by the Diesel Engine Manufacturers Association, and revised in 1946. The new book is the product of member companies of the Association, which coordinated their engineering and sales departments and delegated representatives to rewrite the former treatise. Each of the seventeen chapters in the 1946 edition was carefully checked for any additions and needed clarifications. Besides these improvements there has been added sections dealing with dual fuel engines, operation and maintenance, starting systems, and a variety of new additions included in an appendix.

Revisions in the 1946 edition were made by the following committee in a series of meetings extending over the past year and a half:

Chairman: T. M. Robie, Director of Quality Control, Fairbanks, Morse & Co.; C. F. Pervier, Manager Diesel Engineering Department, Baldwin-Lima-Hamilton Corporation; Paul S. Shirley, Chief Development Engineer, Heavy Machinery Division, Nordberg Manufacturing Company; E. H. Flaherty, Engineering Contracts Manager, Clark Bros. Co., Inc.; T. O. Kuivinen, Administrative Engineer, The Cooper-Bessemer Corporation; J. H. Sheusner, Chief Engineer, Enterprise Division, General Metals Corporation; H. R. Rosenow, Engineering Department, Fairbanks, Morse & Co.; Eric R. Brater, Assistant Chief Engineer, Cleveland Diesel Engine Division, General Motors Corporation; B. G. Mellin, Chief Engineer, Diesel Division, Fulton Iron Works Company; L. V. Armstrong, Chief Engineer, Diesel Engine Department, Ingersoll-Rand Company; L. L. Peterson, Sales Manager, Large Engine Department, Nordberg Manufacturing Company; S. W. Newell, Vice-President, The Union Diesel Engine Company; J. C. Barnaby, Consulting Engineer, and V. M. Holmes, Assistant Manager, Engine Division, Worthington Pump and Machinery Corporation.

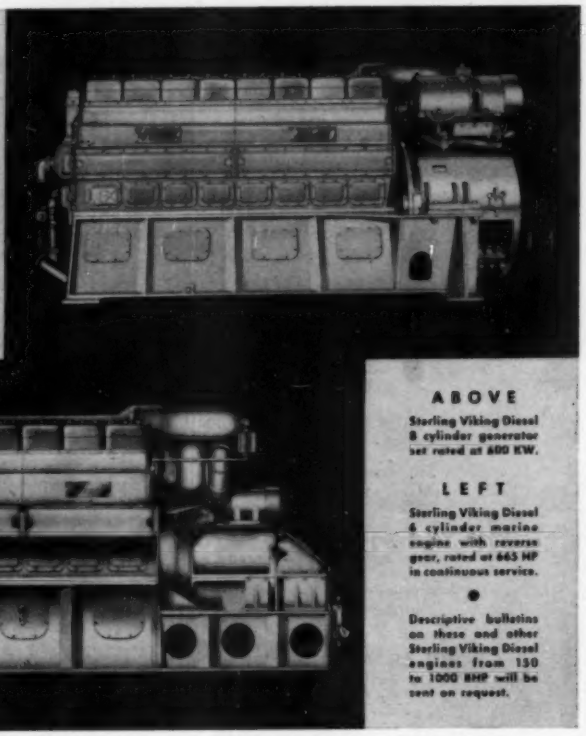
Chapter headings of the new book give an idea of its scope: Definitions; Performance and Equipment; Diesel Engine Construction; Governors and Speed Regulations; Torsional Vibrations and Critical Speeds; Intake and Exhaust Systems and Heat Recovery Apparatus; Starting Systems; Cooling Water Systems; Lubricating Oil Systems; Fuel Storage and Handling Systems; Generators and Electrical Equipment; Selection of Engine Sizes; Diesel Power Plant Buildings; Erection of Diesel Engines; Lubricating Oil Characteristics and General Specifications; Field Test Code; Suggestions Covering the Preparation of Invitations for Bids and Detailed Specifications; Operation and Maintenance; and an Appendix of useful information. The book, off the press around July 1st, is written primarily for consulting engineers, buyers, users and manufacturers of Diesel engines and engine parts and accessories and as a reference for colleges and universities teaching courses in mechanical engineering. The book will be illustrated by 37 drawings and charts. Among the additional illustrations to appear in the book are: "Elevated Temperature Ratings for Diesel Engines"; "Typical Air Intake Arrangement for Dual Fuel or Gas-Diesel Engines with Provision for Preheating"; "Fuel Oil and Fuel Gas Piping for Gas-Diesel and Dual-Fuel Diesel Engines," etc. The book will be priced at $5.00 a copy, and orders should be placed through the Diesel Engine Manufacturers Association, One North LaSalle Street, Chicago 2, Illinois.

Appointed Sales Engineer

Robert P. McBride

The appointment of Robert P. (Pat) McBride as sales engineer, Heavy Machinery Division, has been announced by R. W. Bayerlein, vice-president, Heavy Machinery Division, Nordberg Manufacturing Company, Milwaukee 7, Wisconsin. A native of Wisconsin, Mr. McBride attended Wisconsin University. He was associated with the Wisconsin Power and Light Company from 1938 to 1942. In 1942, he enlisted in the U. S. Navy and was ilater commissioned an engineering officer. He served in this capacity until 1949. In 1950, Mr. McBride came to Nordberg and worked on the diesel test and erection floor. He was assigned to field installation before becoming sales engineer.

50 YEARS OF EXPERIENCE AND PROGRESS



ABOVE

Sterling Viking Diesel 8 cylinder generator set rated at 600 KW.

LEFT

Sterling Viking Diesel 6 cylinder marine engine with reverse gear, rated at 665 HP in continuous service.

Descriptive bulletins on these and other Sterling Viking Diesel engines from 150 to 1000 BHP will be sent on request.

POWER to move ships and trains, to operate machinery or to light airports, means much more than merely installing an engine.

Fifty years of experience...broad and successful experience in applying power to just about every conceivable use is one of the reasons why Sterling engines are held in such high regard the world over.

Engineering progress is a second reason for Sterling preference. The best evidence of what constitutes success in engine design and performance is when customers come back for more.

We have the present day orders, facts and figures to show every marine and industrial user of power that Sterling's first 50 years marks just the beginning. *Talk to a Sterling Engineer.*

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MARINE AND INDUSTRIAL ENGINES

● Depend upon Sterling Diesel Power for Locomotives, Generator Sets, Commercial and Fishing Craft, Lift Bridges, Ventilating Systems, Drilling Rigs, Etc.

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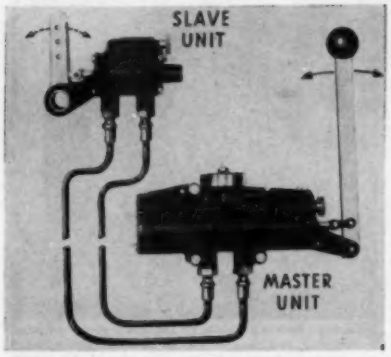
Remote Control Device



Movement of the lever on the master cylinder in either direction is duplicated in the lever of the remote slave unit.

A new hydraulic remote control system is now being offered by Superdraulic Corporation. The complete remote control system consists of a master unit and a slave unit interconnected by two small tubes. Motion applied to the actuating lever of the master unit is accurately duplicated by the slave unit lever. It has positive load carrying ability in both directions because its operation is not dependent upon springs, compressed air or valves. A primary feature of this control system provides for expansion and contraction of both fluid and metal due to temperature changes in a manner that guarantees synchronization between master and slave units. An automatic lock in the slave lever provides irreversibility. The slave unit is also available without this locking feature. Either unit may be mounted stationary or movable and in any position without affecting the operation.

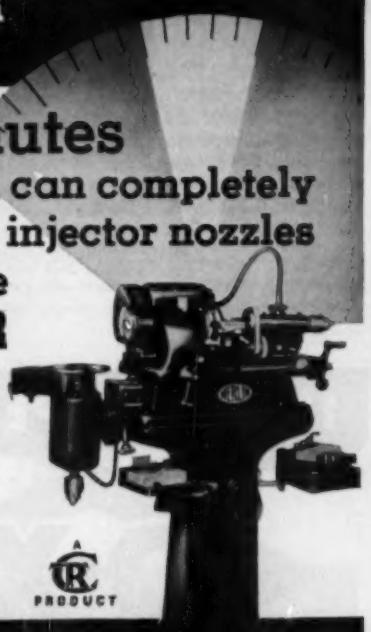
This control system eliminates bell cranks, rods, linkage, cables, gears, sprockets and chains with their inherent disadvantages of backlash, wear and lubrication, thus giving smoother operation and greater rigidity under load. It is self-contained and compact, requiring no external power source. Easy to install and operate, the Superdraulic remote control's self-lubricating features makes for a minimum of wear and maintenance. It is adaptable to most applications. Although small and compact, it is capable of handling 500-inch-pounds of torque. Other sizes will be available soon. For complete details, write DIESEL PROGRESS, File 89, P.O. Box 8458, Cole Station, Los Angeles 46, Calif.

Power Transmission Drives

A complete catalog is now available on the new HY-VO power transmission drives recently announced by Morse Chain Company. The catalog, No. C 72-51, includes: 1) A basic discussion of the operating principles behind chain drives. 2) Highlights of the new design principles incorporated in HY-VO Drives. 3) Description of what the drive will do in the field of high-speed, heavy-duty power transmission. 4) HY-VO capacities, speed ranges and service factors for selecting drives. 5) Installation and lubrication procedures. Copies of the catalog may be had from Morse Chain Company, 7601 Central Avenue, Detroit 8, Michigan.

REDUCE YOUR ATOMIZER REPAIR BILL BY 95%

In 5 minutes
in your own shop you can completely recondition your fuel injector nozzles and needles with the
SERVICE MASTER



- It is the first and only machine that will grind diesel injection nozzle seatings to manufacturers original standards. It will grind a point dead concentric with another portion and retain a predetermined angle to within a minute of a degree.
- The Service Master is quickly convertible for all forms of grinding within its capacity. It cannot lose its accuracy because all moving parts are adjustable to wear.
- *Sole manufacturers and patentees.*

A CR PRODUCT

The MERLIN Service Master

THE MERLIN ENGINEERING CO. LTD. - Hebble Mills, Salterhebble, Halifax, England.

Here's Why

INSTALLATIONS COST LESS

WITH Bendix STARTER DRIVES

CHECK and COMPARE THESE FEATURES

- Starting motor can be mounted more easily and in more positions.
- Requires no actuating linkage—solenoid can be placed in any convenient position.
- Simple in design—has fewer parts—needs fewer adjustments.

Yes, it costs less to install a Bendix* Starter Drive, but that's only part of the story. The outstanding efficiency of the Bendix Drive has been performance proven in over 85,000,000 installations. No other starter drive approaches this record. Whatever your type of diesel, or whatever its purpose, for more dependable all-around performance it pays to specify Bendix Starter Drive.

*REG. U.S. PAT. OFF.

ECLIPSE MACHINE DIVISION of Bendix AVIATION CORPORATION
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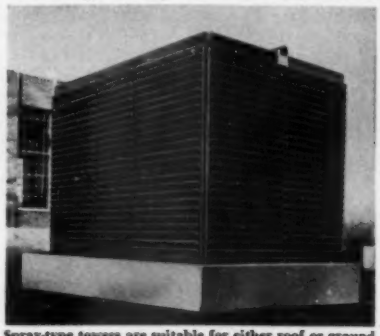
Sales Engineer

Franklin I. Fickett

Franklin I. Fickett, formerly with Fairbanks, Morse & Co., has been appointed sales engineer in Michigan, Ohio and Indiana for Hunt-Spiller Manufacturing Corp., Boston, producer of diesel engine parts, F. W. Lampton, vice president and general sales manager, announced. A native of Hamden, Conn., Mr. Fickett attended Pratt institute and served with the Army transportation corps during World War II.

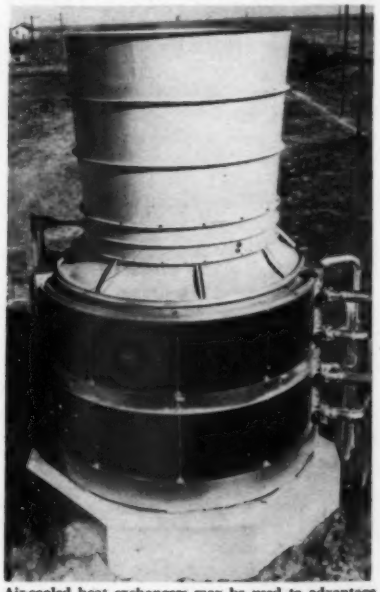
Midwest Power Conference

Mr. Raymond C. Kelly, manager, Equipment Division, J. F. Pritchard & Company of Kansas City, Missouri, and president of the Cooling Tower Institute, recently delivered an address on water conservation before the National Association of Power Engineers. The occasion was the annual Midwest Power Conference held in Chicago recently under the sponsorship of the Illinois Institute of Technology. In his talk, Mr. Pritchard pointed out that althouhg many elements of our industrial, political and social economy has been well studied and substantially planned, the primary resource of water is yet to be adequately measured for availability, thoroughly studied for distribution and comprehensively protected by intelligent utilization because our ultimate industrial strength may well be dependent upon the availability of water.



Spray-type towers are suitable for either roof or ground installation, and may be had as standard spray towers or with coil systems in the base for closed system cooling of liquids or gases.

Mr. Pritchard added, "It is not good management to wastefully use water when invocation of water conservation methods can reduce the slope of the operating cost curve. Growth in demand load reflects directly the industrial growth and population increase of an area. Without effective procedures for water conservation, the natural laws of diminishing returns are invoked. With but one common source of supply, the necessity of mutual approach to the problem is self-evident." It was for this reason that the Cooling Tower Institute was formed. He added that the Institute hopes to share with industry the responsibility of encouraging action on those steps necessary to avoid experiencing, as did the Union of South Africa, "an industrial slowdown because of an acute shortage of the most valuable mineral of all—water!"



Air-cooled heat exchangers may be used to advantage in areas where high cost water or undependable water supply are limiting factors in the use of cooling towers. Unit pictured above takes advantage of wind from any direction and may be used for several simultaneous cooling duties.

Quoting facts and figures, Mr. Pritchard detailed the increased use of water and various cooling methods developed to aid in its conservation.

IN ALL TYPES OF DIESELS!

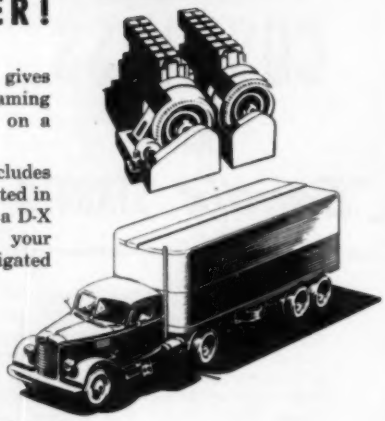
D-X

DHD MOTOR OIL with EXTRINOL

STANDS UP LONGER!

The reason is Extrinol, the "extra" that gives D-X DHD higher resistance to heat, foaming and sludge formation. Try D-X DHD on a money-back guarantee.

The D-X line of industrial lubricants includes a product for every need. If you are located in the Middle West, ask for the services of a D-X Lubrication Engineer in helping solve your lubrication problems. You will not be obligated in any way.



MID-CONTINENT PETROLEUM CORPORATION
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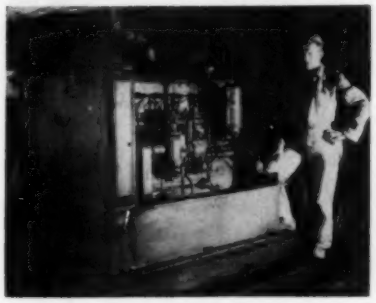
Selecting the small diesel or gas engine driven generator plant, he emphasized that jacket water and lube oil cooling can be efficiently handled by "closed" systems utilizing atmospheric or shell and tube heat exchangers. In larger units, the waste heat may be dissipated efficiently by an induced draft cooling tower. With the present trend toward legislative regulation of surface and underground water, he concluded, "It is hoped that the foresightedness of the power industry in its judicious use of efficient water conservation devices may so minimize the requirement of Federal action that major emphasis may be placed upon the preservation of our greatest natural resource rather than upon the regulation of its use in the production of energy."

Finds Diesels More Economical



Mac Dixon, partner in the Dixon Feed Mill, Markdale, Ontario, Canada, has found diesels more economical on a six-hour day operating basis than hydro-electric power. Dixon stands by his 150 hp. Model HI-600 Cummins diesel, which runs a 24-inch grinder, a 30-inch roller, and a one-ton capacity mixer. With this rig, Dixon said he was able to custom-chop 47,245 bags of feed at a fuel cost of $.0208 per bag in one year. Total fuel cost during this period for the diesel was $981 for 5,450 imperial gallons (18 cents per gallon).

$15 Million in Orders

Baldwin-Lima-Hamilton Corporation announced that it has received orders in recent weeks for 101 diesel-electric locomotives having an aggregate value of about $15 million.

Offices Moved

The Export Department of the Engine Division of The National Supply Company removed its offices from 115 Broad Street to a new building at 600 Fifth Avenue, corner of 48th Street, New York City, on June 20, it has been announced. The New York City offices of the Domestic Department of the Engine Division will remain at 115 Broad Street. Joining in the move with the Export Department of the Engine Division, will be the offices of the National Supply Export Corporation and the New York City offices of Spang-Chalfant Division of National Supply. The three groups will occupy the 20th and 21st floors in the new building.

Lehigh Valley RR to Complete Dieselization

Dieselization of the Lehigh Valley Railroad including main line and branches will be completed by next October, according to C. A. Major, president of the road. The dieselization program will go a long way toward helping the road not only improve service but will keep operating costs down.

DIESEL ENGINE CATALOG will be off the press this month in its Sixteenth expanded Edition. Completely revised and re-edited, it is an invaluable aid to design engineers and designers. ORDER COUPON ON PAGE 73.

HOW BONNEVILLE

Turns Potash into "Gold"

In 1948, this remote Bonneville Potash Plant on the Great Salt Flats in Utah faced serious problems. Tough, costly operating conditions and dwindling market prices demanded action. Production costs had to be "cut" drastically! But how?

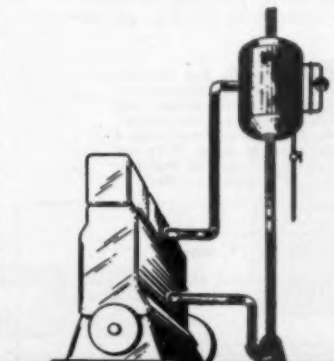
The answer **came in September, 1949, when a Vapor Phase equipped 489 HP Standard Worthington Diesel engine was installed. (See photo at right.)**

Besides converting the engine into a super-efficient power and lighting unit, Vapor Phase permitted the use of a cheap, heavy, high sulphur content engine fuel oil, cutting the normal fuel bill in half. It supplied steam for heating the fuel oil, water, space, etc. It solved the fresh water problem in this isolated desert country.

Here was the economy-plus system that answered every requirement, to "turn potash into gold!"

Thanks to Vapor Phase, this standard Diesel averages 14.25 kw/hrs per gallon on cheap heavy fuel. Lube oil averages 3 gallons per 24 hrs., or 4,320 sea-level-rated HP/hrs per gallon. Lube oil change has been made each 3,000 hrs. instead of the customary 500 hrs. And this plant, since the Vapor Phase system was installed, has produced annually over 70,000 tons of commercial potash *efficiently and profitably!*

NOW, after two years of successful operation, power facilities in this Bonneville Plant have been tripled with the addition of a *Vapor Phase equipped* American Locomotive Co. ALCO DIESEL Engine, Model 12½ x 13, 810 HP @ 600 rpm. With this added power and heat performance, a new high in potash production, at ridiculously low operating costs, is being enjoyed.



VAPOR PHASE pays off in Savings alone, the first year. The unit costs nothing to operate and is good for life.

Modern Vapor Phase, now serving more than 30 different types of old and new engines of all sizes, on thousands of varied jobs, is the *proven lowest cost system* in every way—first cost, operation and savings accrued.

Vapor Phase reduces engine operating costs to a new low—provides record engine efficiency unaffected by ambient temperatures or conditions—doubles and trebles engine life.

—Permits use of low-cost engine fuels, even untreated acid fuels, without harmful effect,

—Eliminates need for expensive boilers, heaters, heat exchangers, troublesome fans, belts, radiators or costly cooling towers, upon which your requirements may now depend.

AND THAT'S NOT ALL!

Vapor Phase equipped engines also serve the multi-purpose job of generating steam, heating water, fluids, space or other process (including cooling or heating through air conditioning systems)—each as required or all at the same time, for the cost of engine operation only.

Write or Wire for Information Applying to Your Specific Needs

Offices in Most Principal Cities

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2835 East Eleventh St., Los Angeles 23

Building Its Own Steel Mill

Because of the critical shortage of steel and the increasing difficulties in obtaining it from Europe, R. G. LeTourneau, Inc., earthmoving equipment manufacturer with headquarters at Peoria, Ill., has started construction of its own steel mill at its plant at Longview, Texas, according to announcement made by the company. An approved Certificate of Necessity for construction has been granted LeTourneau by the National Production Authority. The mill, whose foundation already has been poured, is expected to be in operation by the end of this year, and will be capable of turning out 1,000 tons per day of finished steel plate 144 inches wide, ranging in thickness from 3/16 of an inch to 12 inches. A building 100 feet wide by 500 feet long is being constructed to house the mill, and nearly all of the equipment, such as ladles, furnaces, roller leveler, manipulating equipment and runout tables, are being manufactured in LeTourneau plants.

Sales Agreement

Announcement has been made by J. N. Bauman, vice president in charge of sales of the White Motor Company, that a sales agreement has been made by White with the Freightliner Corporation of Portland, Oregon, whereby the complete line of Freightliner light-weight, cab-over-engine diesel trucks will be made available through the White sales organization. The added models of these Western-type cab-over-engine diesels for highway service will be known as White-Freightliners, to be handled by the sales and service facilities White operates in 11 western states. The agreement brings together White, which has produced trucks for better than 50 years, and Freightliner, which has taken a large part in the development of light-weight cab-over-engine type equipment that lends itself to western operation.

Heavyweight for Light Plant

This 31-ton Superior dual-fuel supercharged diesel engine (pictured above) has been sent to Arcanum, Ohio from the National Supply Company's Engine Division plant at Springfield, Ohio. The engine, which develops 1080 horsepower at 360 rpm., is being installed in the municipal light and power plant at Arcanum where it will operate next to an 800 horsepower Superior engine installed there in February, 1946. Three trucks were required to transport the engine, its 6,850-pound flywheel, 1620-pound turbo-charger, and the auxiliary parts.

New Branch Opened

Robert W. Perry

Fairbanks, Morse & Co., 80 Broad Street, New York City, has announced the opening of its new branch in Philadelphia, Pa., located at 401 North Broad Street. Mr. Robert W. Perry has been appointed manager, with offices on the seventh floor. Mr. Perry's associattion with Fairbanks, Morse began twenty-six years ago, when he started as a clerk. Throughout that time he has been salesman and sales department manager. The new branch will have jurisdiction over eastern Pennsylvania, southern New Jersey, Delaware and the eastern shore of the state of Maryland.

DIESEL ENGINE CATALOG will be off the press this month in its Sixteenth expanded Edition. Completely revised and re-edited, it is an invaluable aid to design engineers and designers. ORDER COUPON ON PAGE 73.

EASY TO EQUIP MANY BARGES WITH COMPACT MONEY-SAVING OUTBOARD PROPULSION

HARBORMASTER Outboard Units Are Easy To Install On Barges, And Cut Your Towing Costs To A Minimum

THE easiest and quickest way to cut your barge towing costs is to install the Harbormaster Outboard Propulsion And Steering Unit on many special purpose barges such as crane barges, flats, lighters, and dredges.

The Harbormaster Unit is like a "giant portable" . . . easy to install, operate, maintain and service. What's more, the Harbormaster gives you the greatly increased flexibility of operation you need . . . in barges self-powered with *outboard* power.

You get the ultimate in maneuverability and economy with the Harbormaster Outboard Propulsion And Steering Unit. It allows you to steer instantly with full power in any direction through the M&T 360° patented method of Propellor Thrust Steering Control. You get big savings in fuel because you have more thrust per horsepower.

Important Features that save time and money include exclusive 180° Elevating Mechanism which allows 1-man operator to easily maintain and service the equipment; and Patented Shear Pin, which automatically shears off should underwater assembly strike a submerged obstacle . . . thus opening up vast new shallow water fields to continuous, reliable operation. Harbormaster models, for all marine purposes, are available in sizes from 20 to 300 h.p., gas or diesel power.

Murray & Tregurtha

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Outboard Propulsion And Steering Units

You'll find detailed data and valuable information in our comprehensive catalog containing over 70 photos and diagrams. Gladly sent you on request, whether you have immediate or future use for Harbormaster units. Why not write for the catalog now so that you will have full information on file?

Murray & Tregurtha, Inc.
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Please send catalog, without obligation, covering the HARBORMASTER Outboard Propulsion And Steering Unit.

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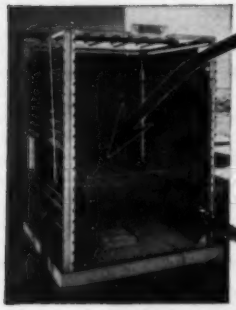


Binks closed-type

DIESEL COOLING SYSTEMS

A Binks natural draft cooling tower with louvers removed to show Binks closed-type evaporative heat exchange coils.

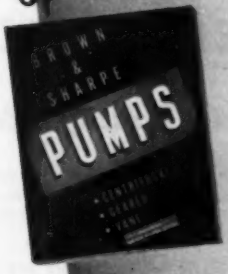
Increased and more uniform heat transfer

Binks Type "D" evaporative heat exchange coils assure Diesel operators uniform...economical engine performance. Two-way cooling by "evaporation" and "convection" plus higher velocity of hot jacket water inside coils gives increased heat transfer. Scale formation in engine jacket is prevented since jacket water never mixes with raw cooling water. Breakdowns are reduced; insurance cut.

Send for Bulletin 41. Obtain full information—drawings, tables—on heat exchange coils adaptable to a variety of operating conditions.

Binks MANUFACTURING COMPANY
3132-38 Carroll Ave., Chicago 12, Ill.
REPRESENTATIVES IN ALL PRINCIPAL CITIES

For Trouble-free Diesel Operation...



Send for a copy of this Catalog and see how many quality-built Brown & Sharpe Pumps are available for diesel use. A wide range of types and sizes in standard rotary geared pumps with various styles of special mountings greatly simplifies the right selection for the job. Have a catalog handy for quick reference. Brown & Sharpe Mfg. Co., Providence 1, R. I., U. S. A.

WIDE SELECTION PERMITS THE RIGHT CHOICE

We urge buying through the Distributor

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ORIGINATOR OF **MICRONIC** FILTRATION

the Finest Way to Make Liquids Come Clean

Nine times out of ten ***Bendix-Skinner*** filters will supply the "finest" answer to your problem. No magic—just the simple fact that ***Bendix-Skinner*** has developed entirely new and exclusive filtering techniques in twenty years of tackling the tough jobs. We'll welcome an opportunity to prove it. An inquiry costs you nothing and may save you much.

***Over 350 Models** providing filtration from 1/2 micron (.000019") upwards at flow rates from 1 to 5000 g.p.m.*

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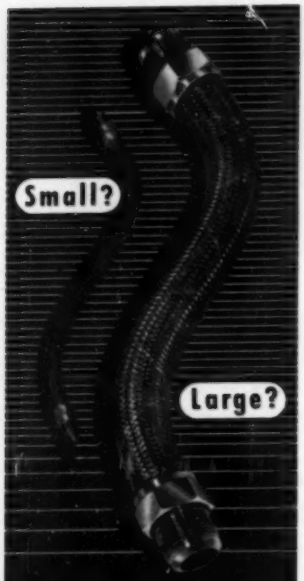
Export Sales: Bendix International Division, 72 Fifth Ave., N. Y. 11, N. Y.



There's a complete size range of

Titeflex

ALL-METAL FLEXIBLE TUBING

Regardless of how you use tubing, there's a size and a type of Titeflex that will do your job. Titeflex is made in diameters from 3/16" to 3", to solve all problems of size. It's made in plain steel, stainless, brass, bronze, monel and inconel to handle all kinds of corrosive gases and liquids. And it's made in types to take temperatures up to 1650° F and pressures up to 6800 lbs.

Titeflex is constructed entirely of metal, with no packing to wear out. It has both flexibility and strength. That's why it does more jobs and lasts longer doing them.

Write for complete catalog

TITEFLEX, INC.

300 Frelinghuysen Ave., Newark 5, N. J.

TITEFLEX STAYS TIGHT WHEN THE GOING IS TOUGH

Unique Exhibit

One of the features of International Harvester's exhibit is the cutaway model of the UD-24 diesel unit. This engine powers the 20-ton International TD-24.

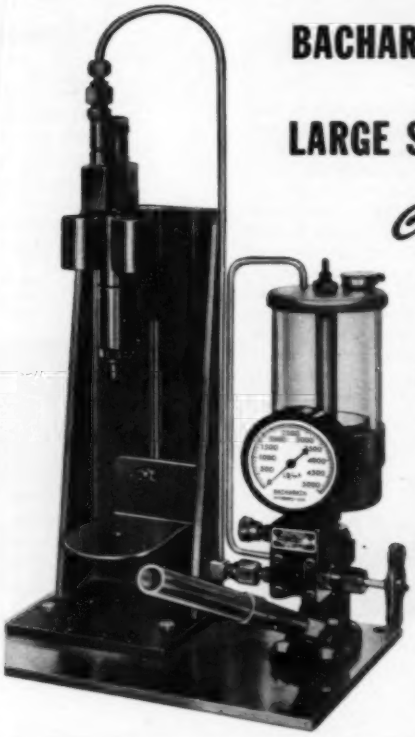
Seeking to provide a capsule answer to the world's biggest single problem—how to feed its multitudes—the International Harvester Company opened a unique and historical exhibit entitled "Panorama of Progress" in its general office building at 180 North Michigan Avenue, Chicago, Illinois. Located on the ground floor along one of the world's most prominent and busiest thoroughfares, the exhibit, using the theme, "Production Means Progress," is designed to educate urbanites and visitors from all corners of the earth about farming methods and the uses of machinery. Entering the exhibit, the visitor looks on a varied display styled in a fashion similar to the company's popular production at the Museum of Science and Industry. Hundreds of bushels of wheat are strewn at the bases of three significant displays shown in sequence to represent the amount of one day's production from each of the respective modes of harvesting and threshing.

The first is the pioneer farmer with sickle in hand, who could cut from one-half to one acre of wheat per day, yielding 9 to 17 bushels. This laborious operation is compared to the original McCormick reaper, a model of which is on display and to the modern combine which cuts and threshes from 20 to 25 acres per day, producing from 350 to 440 bushels of clean, threshed grain a day. The display includes trucks, cutaway model engines, photographic panels and descriptions of the company's production, manpower and distribution facilities.

Elected Vice President—Railroad Sales

V. H. Peterson

Robert H. Morse, Jr., president of Fairbanks, Morse & Co., Chicago, has announced that V. H. Peterson, manager of the railroad division of the company, was elected vice president in charge of railroad sales at a recent meeting of the board of directors. Mr. Peterson has been with Fairbanks, Morse & Co. since 1946. He has had long and varied experience in the railroad field, having been formerly assistant to the president and manager of the New York office of the Baldwin Locomotive Works, which position he held until he joined the Fairbanks-Morse organization in May of 1946.



BACHARACH NOZZLE TESTER for LARGE SIZE DIESEL NOZZLES

Check These Features

- Test Pump 1800 cu/mm capacity; ported design. Leak-proof—plunger is chrome steel, hardened, ground and lapped into pump body.
- Nozzle-holding Fixture has spring clamps that accommodate nozzles of different shank diameters. Nozzle is simply "snapped" into position between the clamps.
- Fuel Supply Reservoir (2.5 pint capacity) of durable, transparent plastic; fuel level can be easily observed.
- Micronic-type Filter is noted for its superior cleaning efficiency; is easily replaceable.

Get full particulars—Write for Leaflet 628.

BACHARACH INDUSTRIAL INSTRUMENT CO.
7000 Bennett Street • Pittsburgh 8, Pa.

Automatic

CRANKING CONTROLS

The Synchro-Start K Series provide interrupted and time limit cranking. They are small, inexpensive controls for automatic starting from any remote pilot switch.

Models available are, KI for small diesel engines and KIR for magneto ignition engines.

The KI and KIR units are provided with a connection terminal for a failure signal should it be desired.

For further information write for Bulletin 405

SYNCHRO-START PRODUCTS, INC.

1851 North Ridgeway Avenue
Skokie, Illinois

ARE YOUR DIESELS READY TO ANSWER THE DRAFT CALL?

● NOW is the time to restore to dependable service that fractured, scored or worn crankshaft. Those worn or damaged cylinders - bearings - pistons - etc.

MANUFACTURING and REPAIRING of heavy castings, crankshafts, bearings, connecting rods, pistons, liners, cylinder heads, valves, etc.

Obsolete parts and items no longer stocked by the engine builder need not keep your power plant equipment out of service.

Our complete line of especially engineered and developed portable machines and "On The Job" equipment may save you valuable time and expense.

CALL, WIRE or WRITE for further information.

"KEEPING PACE WITH DIESEL PROGRESS"

WASHINGTON IRON WORKS, INC.

Established 1876

SHERMAN, TEXAS

DIESEL ENGINE CATALOG

The purpose of this little advertisement is to tell you about Volume 16 of DIESEL ENGINE CATALOG which will be coming off the press about July 14th. This will be the 16th edition of the book that has earned the name of "the bible of the industry."

All smart diesel engine salesmen carry this book around in their car. When they run into some new competition with which they are not too familiar, the DIESEL ENGINE CATALOG gives them full, accurate information when they need it most.

The consulting engineer keeps this book in his reference file. It immediately gives him *all* data on diesel engines coming within a given horsepower range, speed range and weight range.

People who sell, people who buy, people who use diesel engines need this new, fully illustrated, up-to-the-minute volume. It has been completely revised and expanded. Advance orders are now being accepted for the limited edition. Price $10.00 prepaid.

DIESEL PROGRESS

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1. Reduce inventory.
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Two diesel engines suitable for generating or general power use. Apply to K. Bonner, Redding Ridge, Conn. or phone Redding 26.

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PETROMETER
FOR ALL TANKS
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FOR ALL DEPTHS
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PETROMETER CORPORATION
9 STAR BUILDING LONG ISLAND CITY 1, N. Y.

PORTABLE ROCK CRUSHER

These Pioneer portable rock crushers operated by Aggregates Producers, Inc., of Charlotte, N. C. are powered by diesel engines that do not have to be removed from the rig when the rig is removed to another location.

Although powered by three 6-cylinder diesel engines, a portable rock crusher operated by Aggregates Producers, Inc., of Charlotte, N. C., is easily moved from location to location without removing the engines from the rig. Acording to L. G. Hendrix, superintendent and plant manager of the company, this results in an estimated savings of $300 per move and the elimination of 2 days time removing and remounting the engines. The primary unit of the rig is a 24-inch by 36-inch Pioneer PLR jaw crusher powered by a 6-cylinder General Motors diesel. The secondary unit is a Pioneer 40-inch triple roll crusher powered by a GM Twin-6 diesel. The rig was observed in operation near Brevard, N. C., and was turning out 1½-inch to 3-inch aggregate at the rate of 16 to 18 hundred tons per day. A one day peak output reached 2194 tons. The haul on this operation was approximately one quarter mile with three 10-ton GM dieselized Euclids bringing rocks up to three feet in diameter.

Specify **ADECO**
FUEL INJECTION EQUIPMENT
for dependable performance!

ADECO PRODUCTS, INCORPORATED
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MASTER CRAFTSMEN OF FINE FUEL INJECTION EQUIPMENT

CRANKSHAFT GRINDING SERVICE

Four machines giving range from the smallest up to crankshafts with stroke of 13⅛" and 200" O.A.L. Complete grinding service for locomotive, stationary, marine, automotive and compresser crankshafts.

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Prompt Service . . . Accurate Work

Established 1924 . . . 26 years experience grinding crankshafts! The most complete engine rebuilding shop in the Southwest!

THE LARGEST CRANKSHAFT GRINDING MACHINE IN THE WORLD USED IN AN INDEPENDENT REPAIR SHOP

NATIONAL WELDING & GRINDING CO. 2229 CANTON ST. DALLAS 1, TEXAS

Promoted to Chief Engineer

Leonard O. Mjolsnes

Mr. Leonard O. Mjolsnes has been promoted from assistant chief engineer to chief engineer of the diesel equipment section of Scintilla Magneto Division, Bendix Aviation Corporation, Sidney, New York, filling the vacancy resulting from the death of Mr. A. T. Bremser. Mr. Mjolsnes joined Scintilla in July 1947. Prior to this time he was employed by Baldwin Locomotive Works in Philadelphia and the Detroit Diesel Engine Division of General Motors. His experience in the diesel field includes research, design and application of both two and four cycle engines of marine, stationary, vehicle and railroad types. Mr. Mjolsnes obtained his BSME degree at the University of Minnesota in 1935.

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Nordberg Distributor

The appointment of E. M. Wakeman & Associates, Lakeland, Florida as industrial distributor for Nordberg 4FS diesel engines in the state of Florida and the Gulf counties of Mobile and Baldwin, Alabama, has been announced by Nordberg Manufacturing Company of Milwaukee, Wisconsin. E. M. Wakeman & Associates maintain complete coverage of their territory with salesmen located in leading industrial and trading centers of Jacksonville, Orlando, West Palm Beach, Miami, Tampa and Pensacola, Florida. Mr. E. M. Wakeman, owner of the company and Mr. Scott Linder, sales manager, work out of the centrally located home office in Lakeland. A company plane gives both officials close contact with customers, prospects and company salesmen.

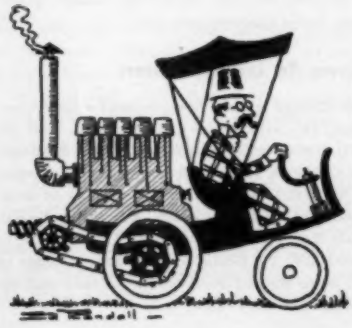
Elected Executive Vice-President

Winfred S. Axford

Winfred S. Axford has been elected executive vice president and a director of A. S. Campbell Co. and its Boston subsidiary, Hunt-Spiller Manufacturing Corp., producer of diesel engine parts, Neil C. Raymond, president, announced. Mr. Axford joined A. S. Campbell in 1936 as a timekeeper. Advancing through stores and materials and cost control departments, he became production manager in 1946. He has been comptroller and assistant to the president since January, 1951.

New Engine on Market

The B & W Alpha diesel engine which has already won high acclaim in more than 40 countries, is now available on the American market in the range of 90 to 360 bhp., according to an announcement by Burmeister & Wain American Corporation, 17 Battery Place, New York City. In connection with the introduction of this engine which has been developed by Burmeister & Wain in Denmark in order to provide a simple, reliable and economical power plant for fishing vessels and other small craft, the corporation has appointed Francis Minot of Cotuit, Mass., maritime consultant, as New England representative.



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FOR CORROSION CONTROL

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LOCOMOTIVE DIESELS — Add 6 lbs. of Sodium Chromate to systems having a capacity of about 250 gal., and maintain concentration at about 2,500 ppm.

MARINE DIESELS — Start with about 2,000 ppm. of Sodium Chromate in the engine-jacket system, and maintain this concentration. Submarines and some other naval vessels provide an additional factor of safety by employing 5,000 ppm.

STATIONARY DIESELS — Start large installations with closed engine-jacket systems by adding 1,000 ppm. of Sodium Chromate; later maintain about 400 ppm. For smaller installations, employ higher concentrations. For open systems, start with 500 to 1,000 ppm. of Sodium Chromate and lower the concentration over a period of 1 to 3 months to the lowest maintained concentration at which protection is satisfactory, usually about 200 to 500 ppm. For large open systems employing cooling towers, use Sodium Bichromate and adjust to pH 7-9.

Write for complete information about the application in which you are interested.

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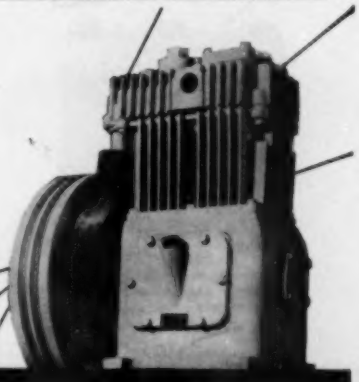
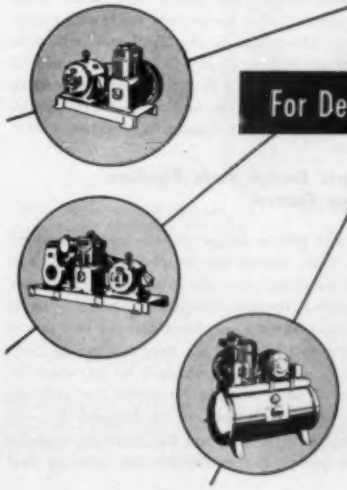
MODERN COMPACT

Quincy COMPRESSORS



For Dependable COMPRESSED AIR SUPPLY



Quincy Compressors are not only compact, but they are always dependable. Specially designed for greater durability, Quincy Compressor features include—Timken bearings—Lynite rods—perfectly balanced crankshaft — copperfinned intercooler — automatic and positive lubrication. Quincy Compressors are available in a wide variety of sizes ranging from 1 to 90 c.f.m. Depend on a Quincy specialist to help you select the correct type and size compressor to meet your requirements. Write Dept. K-19 today for details and latest prices.

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Flexible ALL METAL
COUPLINGS
FOR POWER TRANSMISSION
REQUIRE NO MAINTENANCE

Patented Flexible Disc Rings of special steel transmit the power and provide for misalignment and end float.

Thomas Couplings have a wide range of speeds, horsepower and shaft sizes:
½ to 40,000 HP
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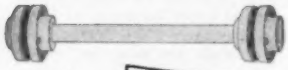
Specialists on Couplings for more than 30 years



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Lubrication is
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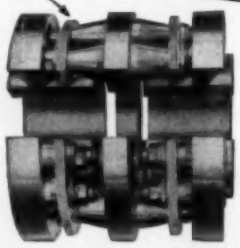
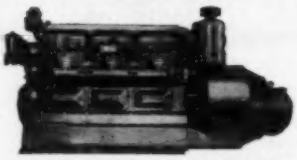


THE THOMAS PRINCIPLE GUARANTEES PERFECT BALANCE UNDER ALL CONDITIONS OF MISALIGNMENT.

NO MAINTENANCE PROBLEMS.

ALL PARTS ARE SOLIDLY BOLTED TOGETHER.

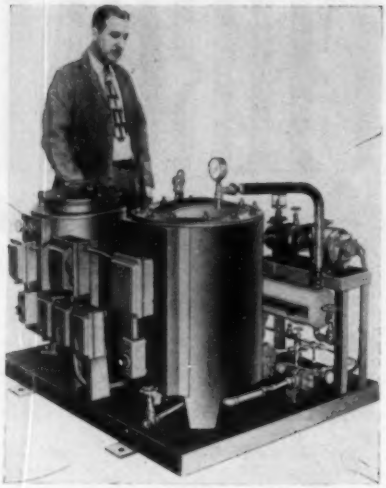


FOR SUCH TOUGH JOBS AS: DIESEL COMPRESSOR DRIVES, MARINE MAIN DRIVES, LOCOMOTIVE MAIN DRIVES, AUXILIARY DRIVES, ETC.

Write for the latest reprint of our Engineering Catalog.

THOMAS FLEXIBLE
COUPLING CO.
WARREN, PENNSYLVANIA

New Oil Conditioner Unit



A new 25-40 gph. oil conditioner unit, specifically designed for small-batch clarification of used hydraulic, lubricating, run-in and transformer oils, has been placed in production by the Filtration Division of U. S. Hoffman Machinery Corporation of Syracuse, N. Y. Both insoluble and soluble impurities are reported to be completely removed by the unit which combines a cartridge filter (for removal of metal, gums, tars, residues, soot, carbon, dirt and sand) and a vaporizer (for extraction of free and emulsified water, fuel dilution, air, gases, etc.). Prior to the introduction of this particular oil conditioner model, the advantages claimed for it were available only in the company's larger size models to users having 50 to 600 gph. flow rate requirements. The advantages according to the Hoffman announcement, include simplicity, convenience and economy in purifying turbine, circuit breaker, transformer, vacuum pump, cable, compressor, hydraulic and refrigeration oils to "like new" condition. Avoidance of high maintenance costs, such as occur with centrifuges is stressed. The cartridge filter and vaporizer which form the unit are mounted on a common base, portable, if desired, and are complete with all necessary electric and pump connections. Filter and vaporizer may be operated singly or together. Overall dimensions of the 25-40 gph. oil conditioner are 54-inches wide, 42-inches deep and 37-inches high. Further details may be obtained by writing Filtration Division, U. S. Hoffman Machinery Corporation, 219 Lamson St., Syracuse 6, N.Y.

Proper Design Aids Pipeline Surge Control

Through proper design and the use of snubbers, such costly innovations as special piping or specially reinforced pipe line structures in compressor installation becomes unnecessary, according to an industrial bulletin on "Surge Control in Gas and Air Piping," issued by the Burgess-Manning Company. This bulletin, published by the manufacturers of noise abating equipment for industry, states that installation can be designed that will be free from surging and the resultant vibration of gas pumps. It also contends that metering fluid flow will be greatly simplified in a properly designed system.

It is explained that surging due to the pulsating flow of compressible fluids in pipe lines is not an acoustical problem but one of dynamics. The application of snubbers provides surge control which permits operation of plant and equipment at rated design conditions is stressed.

The Bulletin advocates use of snubbers in compressor systems in order to: "1. Eliminate, reduce, or prevent vibration in all lines due to the intermittent suction or discharge of a compressor, blower, or pump. 2. To protect such associated equipment as coolers, scrubbers, separators, heat exchanges, and process equipment from mechanical failures due to excesive gas surge. 3. To reduce surge as it affects metering and the readings and operation of pressure and flow controls."

"The function of the snubbers," the Bulletin points out, "is to prevent the rapid pressure change, which occurs at the compressor or blower, from being transmitted to the pipe line. It accomplishes this by reducing the rate of change of the exciting force at the beginning of the pipe line so that the pressure due to the pumping of gas into the pipe does not change rapidly enough to cause the mass of gas in the pipe to oscillate. The Gas and Air Line Snubber smooths the flow without excesive restriction and stops vibration without mechanical damping. This results in a marked reduction in maintenance to pipe lines, compressors, and associated equipment. These snubbers can be installed in open end or closed gas and air piping systems with equally satisfactory results."

Fields of application for the gas and air line snubbers are described as: oil and gas production; oil and gas well repressuring and recycling; gas transmission; gas distribution; natural gasoline industry; manufactured gas industry; petroleum refining; petro-chemical process industry; chemical industry; those handling air, steam, refrigerants.

Illustrated Booklet

Bulletin Q-14, "Elliott Equipment for Power Plant and Industry," has been released by Elliott Company, Jeannette, Pa. Liberally illustrated, this booklet reviews the complete Elliott line, describes briefly the major steam and electrical products of the five Elliott plants. Material is organized into sections, one covering steam and related equipment (turbines, centrifugal blowers, condensers, heaters, tube cleaners, etc.) and the other devoted to rotating electrical equipment (motors, generators, motor-generator sets, etc.).

Moves To Larger Quarters

The Chicago midwest headquarters for Sarco Company, Inc., sales representatives moved April 30, 1951 to new and larger space at 322 West Randolph St., Chicago 6, Illinois. The new telephone number is Andover 3-2513-4-5. This manufacturer of steam specialties has its main sales office in the Empire State Building, New York City. The factory is at Bethlehem, Pa. George H. B. Burke, manager of the Sarco midwest headquarters, has been with the company for forty years.

Inland River Reports

By DAVID I. DAY

MORE THAN 1,000,000 tons of cargo are passing monthly since the first of May through each of the seven locks on the Illinois River, it was recently reported. The Dresden Lock is handling the largest tonnage, around 1,200,000 monthly. Coal was the leading commodity, with petroleum products, sand and gravel, and grain in that order. Virtually all the towboats on the Illinois are now propelled by diesel.

THE ASHLAND OIL & REFINING CO. owner of one of the largest and most popular fleets of diesel towboats, home port, Ashland, Ky., on the Ohio River, is having 12 new articulated steel oil barges built at the Ingall Shipyards at Decatur, Ala., on the Tennessee River. Each of the new barges is 290 x 52 x 12. The company is also having built two standard oil barges, each about 150 x 50 x 12.

LITTLE EVIDENCE of the recent upper Mississippi River floods can be noted in passing up or down the stream from St. Louis to St. Paul and Minneapolis. Your correspondent observed among the most active boats this month the *Emory T* (Cooper-Bessemer 800 hp.), the *Albert E. Heekin* (1000 hp., twin Cooper-Bessemers), *Kansas City Socony*, (1020 hp., National Superior twins), the *Anker L. Christy* (1200 hp., Cooper-Bessemer triplets), and many more, including distance views of boats we believe to have been the *R. H. McElroy*, the *Sturgeon Bay Queen*, the *Frank L. Blaske* and the *Bull Calf*. As on the upper Ohio there were a few years ago many steamers in evidence. Very few can be seen now around St. Louis. In fact we never saw a single one on this trip.

IT IS THE VERDICT of all Ohio River boatmen that no better performance was ever turned in over the years than that of the *Wm. Penn* of the Union Barge Line fleet. Few if any towboats were ever more frequently photographed. The boat was built 11 years ago at the Dravo Yards, Neville Island, below Pittsburgh. In dimensions, 176 x 36 x 10, she is powered by two National Superior diesels. Her Kort Nozzles give her around 1600 hp. push. We were pleased to see this lovely old pusher teamed up with the *Lehigh* in shoving up the river seven barges of oil, one of scrapiron, one of fluorspar, one of coal and one of steel. Capt. R. W. Lipe was in command of the *Penn* with Capt. Wilson Fry at the pilot controls.

THE *LEHIGH* is a much newer boat but has seen six busy years—a 2400 hp. boat powered by twin National Superiors. She came off the Dravo ways at the same time as the *Cornell*. The boats are exactly alike. Both are particularly efficient in stormy waters—always dependable.

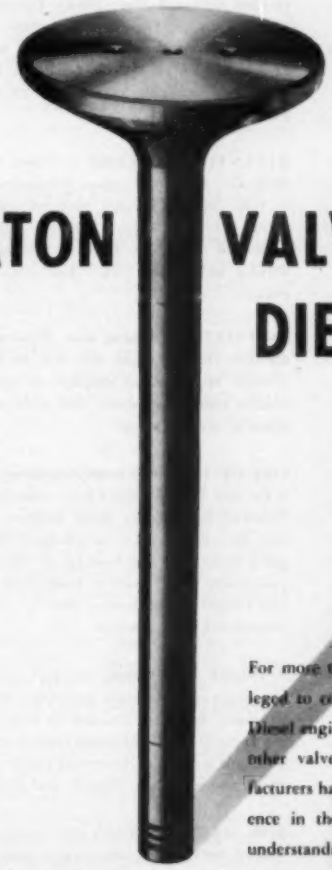
POWER PERSONIFIED is the new 3200 hp. *Claude Tully* noted at work on the upper Ohio this month, upbound with an integrated oil tow. Built by the St. Louis Shipbuilding & Steel Co., for the Patton-Tully Transportation Co., Memphis, Tenn., the boat is all neatly limbered up, running like a deer. We saw her just above Cincinnati. Capt. Geoffrey Moore was in the pilot house.

QUITE A NUMBER of active rivermen in and around St. Louis have seen the new Nordberg "Supairthermal" diesel engine, an 800 hp. unit, on display at the Busch-Sulzer Bros. plant there. It features high pressure supercharging and is regarded as a promising innovation.

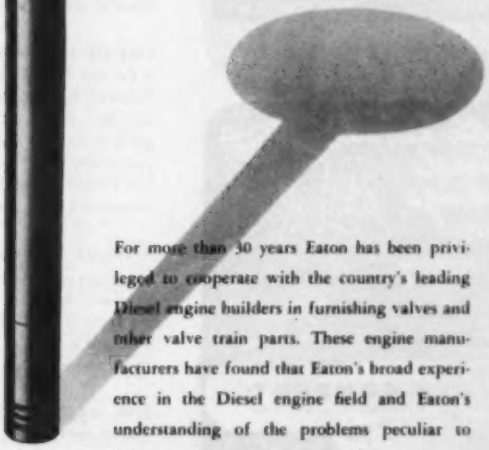
AT WORK on the intracoastal canal is the brand-new 2000 hp. towboat *Houston* owned and operated by the Coyle Lines. She was recently completed at the Arnold V. Walker Shipyards, Pascagoula, Miss. Measuring only 110 x 30 x 11, she is as modern as this morning in all respects. She is powered by twin Chicago Pneumatic diesels furnishing 2000 hp. at 720 rpm. The auxiliary power is from two 6-cylinder Waukesha diesels. It has Coolidge propellers, Carlisle & Finch searchlights, TCA radar, Kahlenberg horn.

THE *M. V. JOHNNY WALKER* is now flying Union Barge Line colors having been purchased from the Simpson Towing Co. The boat was built in 1948, at the Walker Shipyards, Pascagoula, Miss. She has General Motors (Cleveland) twin diesels, 2880 horsepower.

DIESEL ENGINE CATALOG will be off the press this month in its Sixteenth expanded Edition. Completely revised and re-edited, it is an invaluable aid to design engineers and designers. ORDER COUPON ON PAGE 73.



EATON VALVES for DIESEL ENGINES



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West Coast Diesel News

By FRED M. BURT

FOR THE Southern California Water Co., a Buda 175-hp. (PC-2505) natural gas engine to power a Layne-Bowler deep well turbine pump in a water well at Duarte, a similar installation soon to be made at Bell, Calif.

FOUR NEW 300-hp. Le Roi natural gas engines installed by Kaw Pipeline Co. at Russell, Kan. for pumping oil also have a Vapor Phase cooling system (from Engineering Controls, Inc., Los Angeles) to add about 40% to the cooling capacity of the engine radiators, a desirable addition for hot weather operation.

NEW CUMMINS diesel engine powered trucks recently delivered—three 175-hp. Diamond T's for Harry Williams, Los Angeles trucker; also a 200-hp. Mack; Autocars—four 200-hp. for Safeway Stores; two of 275-hp. for Garibaldi Bros., Maywood; two tanker trucks of 175-hp. for Allyn Tank Lines, Los Angeles.

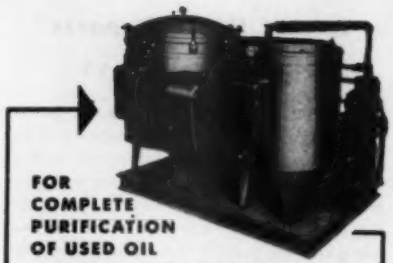
RECENTLY LAUNCHED by Puget Sound Boat Bldg. Co., for John Cordoza & Associates, the 105-ft. tuna clipper *Crusader*, powered with a 600-hp. Enterprise diesel engine, with two 165-hp. Enterprise and one 60-hp. General Motors auxiliaries driving 65-kw. and 30-kw. Fairbanks-Morse generators.

INSTALLED in fishing boat *Western Pride* by Crofton Diesel Engine Co., San Pedro, a 2-cyl. General Motors diesel auxiliary to operate refrigeration system and winch, and with an Ingersoll-Rand air-starting motor.

ONE OF THE finest boats ever built in the area is the new 48-ft. dragger *Cecelia* constructed at the Lindwall Boat Works, Santa Barbara, for Castagnola Bros. Sea Food Co., which has a 120-hp. Caterpillar diesel from Shepherd Diesel Marine, Inc. for propulsion power with a Twin Disc 2:1 reverse and reduction gear and an 1800 ft. cable capacity Shepherd Trawling winch.

A MODEL MO-893 Buda dual fuel engine running on sewage gas and butane to power a 50-kw. G.E. ac generator has been installed to supply power at the Indio (Calif.) Sanitation District sewage plant; also used is a Square D control panel and a Vapor Phase system for heat recovery and engine cooling.

FOR MASON METALS CO., Vista, Calif., for general lighting and power on a construction project, a new D-311, 35-hp. "Caterpillar" diesel as part of a 20-kw. generating set.



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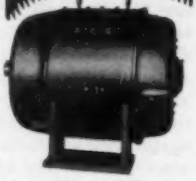

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FOR ASBURY TRANSPORTATION CO., Los Angeles, two Mack trucks with 200-hp. Cummins diesels; two of the same units for S. W. Portland Cement Co.; White trucks with 200-hp. Cummins diesels, two for Ferini & Ardentz, Santa Maria, Calif. and two for Parker Truck Co., San Diego.

IN PREPARING the Elk Hills Naval Oil Reserve for greater activation in case of war, for repressuring gas in a new, large natural gasoline plant, being installed, are about 6500-hp. Clark Bros. compressors—seven at 880-hp., one at 330-hp., natural gas for fuel.

GENERAL MOTORS diesel engine installations by West Coast Engine & Equip. Co., Ft. Bragg, Calif. a 6-cyl. unit for Frank Koski's 42-ft. combination boat, *Ben Ray;* in Roy Clark's 35-footer *Roy C.* a 3-cyl. G.M.

WITH A 400-hp. Enterprise diesel for propulsion power and two General Motors diesel auxiliaries, the new 96-ft. tuna clipper built at Peterson Boat Bldg. Co., Tacoma, has been delivered to Frank Fernandes (Managing Partner) and Associates, San Diego.

FROM EMIL RIUTTA'S Engine Sales & Service, Los Angeles, a Model 21, 6-cyl. 150-hp. Murphy diesel for Chas. E. Rounds, Los Angeles earth-moving contractor to power an 80D Northwest shovel and dragline combination; a surplus unit purchased minus engine.

FOR TRANSHIPPERS, INC. an iron mining company, for use in Lucerne Valley, in Southern California, a 3-cyl. Model 387 P & H 70-hp. diesel engine to power a 215-cfm. Gardner-Denver air compressor.

SALES AND SERVICE operations of The National Supply Co., Engine Division, (Superior and Atlas Imperial engines) in Oakland are now located at 2510 Grove St., Oakland 12; phone TE. 6-1012; Branch operations directed by J. H. Crock; David Ury is parts and service manager.

PURCHASED BY Pacific Borax Co. for power supply at their town, Death Valley Junction, a 75-kw. diesel-generating plant, with "Caterpillar" D-13000, 120-hp. diesel and Caterpillar-Louis-Allis generator.

MAKING its third move due to business expansion, into a new, larger plant at 1077 Eastshore Highway, Berkeley, Calif. — phone LAndscape 5-2261—West Coast Engine & Equip. Co. handles GM diesel engines, industrial and marine; Chrysler, industrial and marine; Petter, diesel industrial; Willard storage batteries; U. S. Motors, electric generating plants, etc. Muirson Wright is president and sales manager; Chet Bolay, service manager; Dick Miller, parts manager; Tom Genn, sales engineer.

THROUGH its marine sales and service representative, Nicholas B. Bobrick, Cooper-Bessemer Corp. presented the American Tunaboat Association with a large perpetual trophy for its annual low gross golf tournament; this year at San Diego, May 4.

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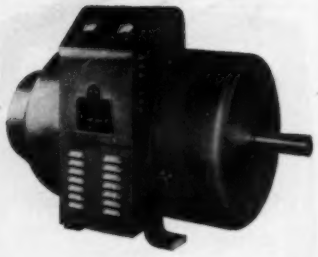

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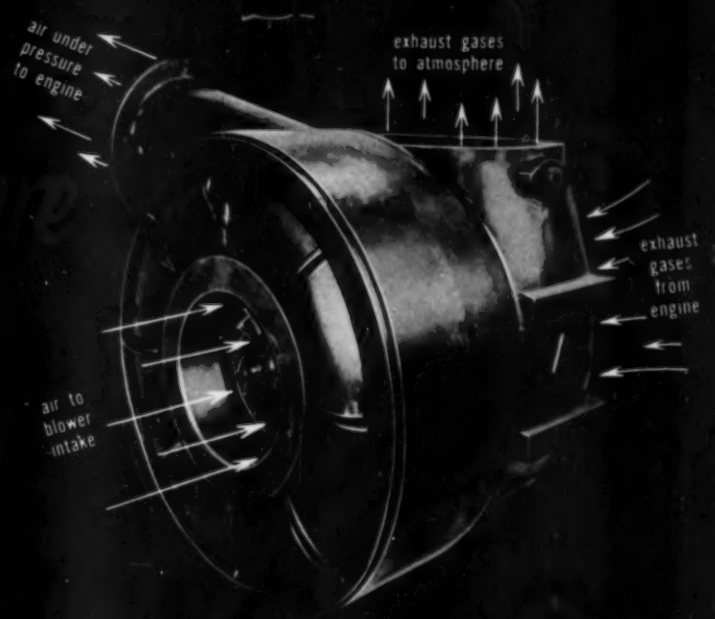

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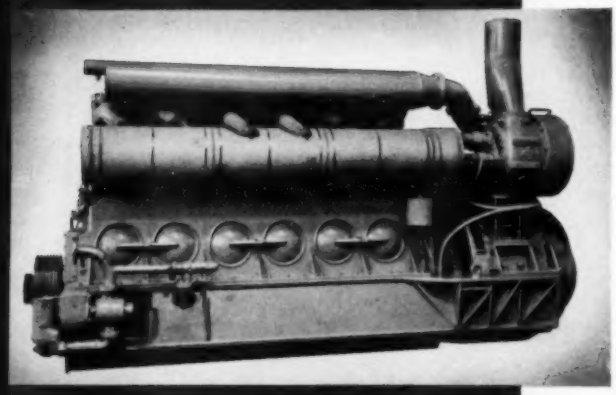

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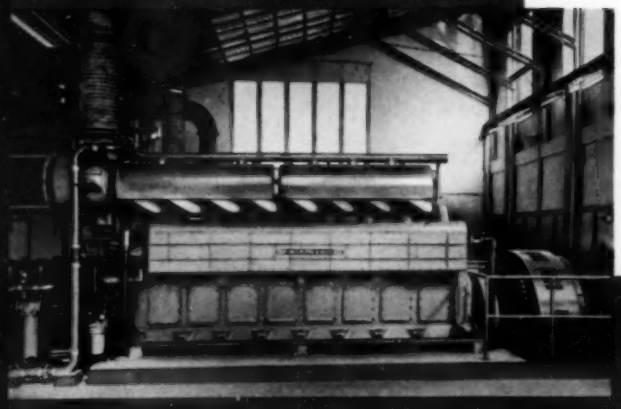

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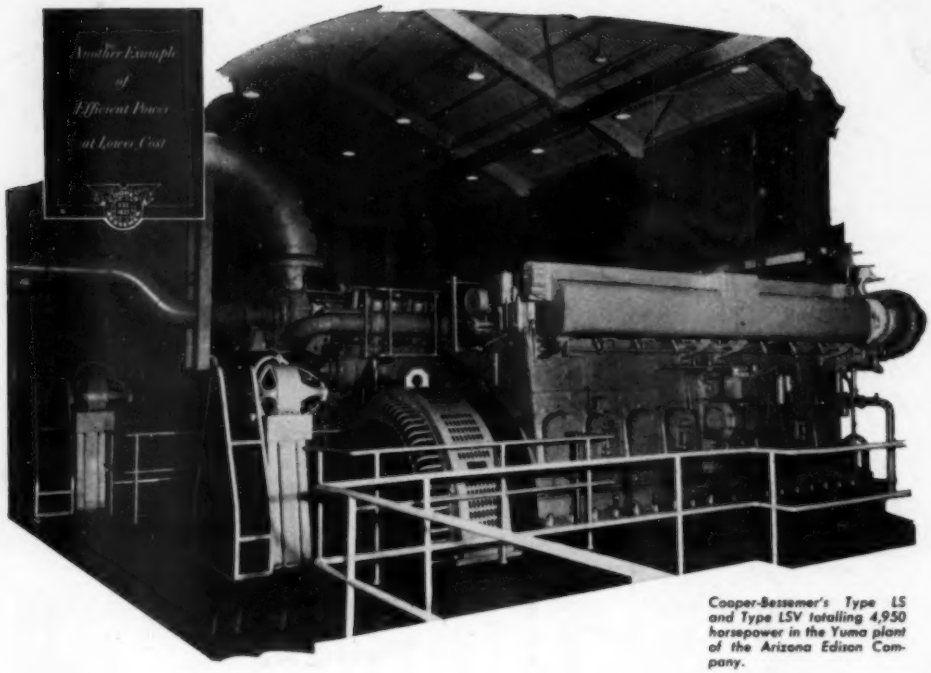

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